THE EFFECTS OF ALPHABETIC WORD WORK WITH MANIPULATIVE LETTERS ON THE READING ACQUISITION OF STRUGGLING FIRST-GRADE STUDENTS

By

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Abstract of Dissertation Presented to the Graduate School
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THE EFFECTS OF ALPHABETIC WORD WORK WITH MANIPULATIVE LETTERS ON THE READING ACQUISITION OF STRUGGLING FIRST-GRADE STUDENTS

By

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This study examined the effects of alphabetic word work with manipulative letters on the reading skills of struggling first-grade students. Participants were 98 first-grade students at risk for reading disability. Participants were randomly assigned to three groups: (a) treatment, (b) comparison, and (c) control. The treatment group received 6-10 weeks of small group instruction using manipulative letters to practice decoding and recognizing words in a meaningful context. The comparison group received the same small-group reading instruction without the manipulative letters. The control group did not receive supplemental small-group instruction.

The intervention was implemented in 30 lessons in groups of three students in nine schools in two north central Florida districts. Dependent variables included phonological awareness, sight word reading, decoding of nonwords, decoding of words, passage fluency and reading comprehension. In addition to the related literacy assessments, social validity measures were administered to determine the acceptability and viability of the intervention. Intervention instructors and classroom teachers completed surveys, and participants were interviewed.

Statistical analyses of the data revealed significant group differences on measures of phonological awareness, decoding, and sight word knowledge. The treatment group scored significantly higher on measures of decoding than the comparison and control groups. Students in the treatment group also scored higher on measures of phonological awareness and sight word knowledge than the control group. The differences at posttest on measures of fluency and comprehension were not significant. The intervention was considered acceptable to 100% of the teachers and intervention instructors surveyed.

The findings of this research hold important implications for reading instruction. The results of this study support the hypothesis that multisensory instruction helps the struggling reader develop the necessary connections that allows efficient functioning of the reading system. A benefit of this intervention is that it focuses on two of the skills related to core deficits of reading disability. A majority of students with reading disability experience difficulty in phonological awareness and many have deficits in orthographic processing. Instruction with manipulative letters may improve skills in deficit areas and help to prevent reading failure.

CHAPTER 1
INTRODUCTION TO THE PROBLEM

Literacy is critical to success in our culture, and reading, specifically, is a skill that is required to ensure social and economic security. In fact, reading is so vital to success in life that the National Institute of Child Health and Human Development (NICHD) has now deemed reading failure a public health concern (Lyon, 1999). Unfortunately, current research and statistics in reading achievement indicate that the rate at which children are failing to learn to read is alarming. While reading failure is more common among poor, nonwhite, and non-English-speaking students (Snow, Burns, & Griffin, 1998), the problem of low levels of literacy has affected children from all socioeconomic backgrounds (Lyon, 1999). On the 1998 National Assessment of Education Progress (National Center for Education Statistics, 1999), 49% of the children who scored below basic level of proficiency were the children of college-educated adults. These data are disturbing because studies indicate that students who start off poorly in reading rarely catch up (Adams, 1990; Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997; Kaméenui, 1993; Liberman & Liberman, 1990; Torgesen, Wagner, & Rashotte, 1997; Torgesen, 2000).

Further evidence that a literacy crisis exists is provided in the 1992 National Adult Literacy Survey (NALS). The National Center for Education Statistics (NCES) reported that 21% of adults in the United States, or approximately 40 million individuals, perform literacy tasks at a very low level (the lowest of five levels described in the NALS). Of that group, approximately 8 million adults are unable to perform even simple literacy tasks (NCES, 1993). Forty-eight percent of Americans are unable to "integrate multiple pieces of information, or generate responses based on information easily identified in the text" (NCES, 1993, p. 3). Results of these surveys and achievement tests illustrate a sobering reality; while higher levels of literacy are needed in an increasingly technological society, the literacy levels of American students remain well below the standards required for social, economic, and academic success.

Rationale for the Study

Children who fail to learn to read in the primary grades are likely to remain poor readers throughout their schooling and beyond (Adams, 1990; Juel, 1988; Stanovich, 1986). Fortunately, research in reading over the past two decades has provided insight into the skills necessary to become a successful reader. Numerous studies have demonstrated that a child's understanding of the sound structure of language and the alphabetic principle is a strong predictor of later success in reading (Adams, 1990; Rack, Snowling, & Olson, 1992; Torgesen et al., 1997). In fact, the ability to decode in first grade is highly predictive of comprehension skills in ninth grade (Juel, 1988). Furthermore, Torgesen et al. (1997) asserted that the inability to decode unknown words in print is the primary cause of reading failure. Thus, effective instruction in the alphabetic principle and decoding are crucial in early reading acquisition.

The purpose of this study was to determine the effectiveness of a specific intervention for improving reading skills of struggling readers, specifically decoding and word recognition. The intervention was based on empirical evidence of recent educational research. Current research supports the implementation of interventions that focus on phonological awareness and the alphabetic principle (e.g., Bradley & Bryant, 1983; Fielding-Barnsley, 1997; Haskell, Foorman, & Swank, 1992; Hatcher, Hulme, & Ellis, 1994; Uhry & Shepherd, 1997). Further, instruction should teach phonological recoding skills explicitly and systematically (Adams, 1990; Haskell et al., 1992; Snow et al., 1998; Uhry & Shepherd, 1997; Yopp & Singer, 1985). In connectionist theory, upon which this study is based, knowledge is dependent upon the strengthening of connections among processing units (Bereiter, 1991; McClelland, 1986). Through explicit and systematic instruction in a meaningful context, the circular connectivity within three processing units is strengthened: (a) phonological processor, (b) orthographic processor, and (c) meaning processor (Adams, 1990).

An area of reading research that has been neglected is the study of the effectiveness of multisensory instruction in reading interventions. Although multisensory techniques have been recommended since before the 20th century, Moats and Farrell (1999) pointed out that their effectiveness has not been substantiated by scientific research. Montessori (1912) incorporated a tactile-kinesthetic component in reading instruction by using sandpaper letters to help make letter-sound connections. In another approach, children with disabilities learned to read by tracing over large printed words with their finger until they had memorized the word (Fernald & Keller, 1921). Orton (1937) also recommended the use of reading methods that incorporated visual, auditory, and kinesthetic modes of learning.

Although it has not been scientifically confirmed, the use of teaching methods that engage auditory, visual, and kinesthetic modes simultaneously may be effective in strengthening connections between processing units. One multisensory teaching approach is the use of alphabetic word work with manipulative letters to teach phonological recoding. Although several recent studies have employed effective interventions that use manipulative letters (e.g., Bradley & Bryant, 1983; Clay, 1993; Fielding-Barnsley, 1997; Greaney, Tunmer, & Chapman, 1997; Haskell et al., 1992; Iversen & Tunmer, 1993), no studies have isolated manipulative letters as an independent variable. In mathematics instruction, however, the use of manipulative objects for teaching abstract concepts has been empirically supported for many years (Lambert, 1996; Mercer & Mercer, 1998). The purpose of this study was to determine the effects of a specific multisensory approach on the reading skills of struggling first-grade readers. Specifically, the question that guided this study was "What are the effects of alphabetic word work with manipulative letters on various reading skills of struggling beginning readers?"

Scope of the Study

This study was conducted within a limited scope. The delimitations and limitations are described in the following sections.

Delimitations

This study was delimited by geographical location to two school districts in Florida, Alachua County and Marion County. Both are medium-sized districts in the north central part of the state. The subjects were 98 first-grade students in nine schools. The schools selected represent the makeup of the general population in socioeconomic status, gender, and ethnicity (see Chapter 3, Table, 1). Students were selected based on a group screening assessment of phonological awareness and the alphabetic principle. Students with low scores on the group measure who received parental consent to participate were pretested on measures in five general areas including (a) phonological awareness, (b) alphabetic principle and decoding, (c) word recognition, (d) reading fluency, and (e) reading comprehension. Students were randomly assigned to groups. Subject selection and assignment did not include consideration for gender, ethnicity, socioeconomic status, or special education status.

Limitations

This study was conducted with first-grade students struggling to acquire reading skills. The results of this study cannot be generalized to older or younger students. The study may be further limited because the intervention was conducted in small groups outside of the regular classroom and cannot be generalized to large-group settings.

Definition of Terms

An understanding of applicable terminology is critical to the implementation and interpretation of this investigation. The following section defines relevant terms as they apply to this study.

Orthographic processing refers to the use of printed symbols (i.e., orthographic information) to process written language (Wagner & Barker, 1994). Several varieties of orthographic knowledge are required for orthographic processing (Berninger, 1994).

Orthographic structure refers to the systematic patterns in written language such as the sequential and positional occurrences of letters (Berninger, 1994).

Phonological awareness refers to a conscious sensitivity to the sound structure of language. It includes the ability to detect, isolate, blend, segment, and otherwise manipulate the sounds in language (Adams, 1990; Snow et al., 1998; Torgesen & Bryant, 1994).

Decoding refers to the process a reader uses to interpret abstract symbols as a unit that bears meaning (Beck & Juel, 1992). Decoding is often confused with phonological recoding.

Phonological recoding refers to the process of mapping speech sounds in written words to the corresponding graphemes and blending those sounds together to determine the appropriate pronunciation.

Phoneme refers to the smallest unit of spoken language. For example, the word *ship* contains three phonemes (/*sh*/ /*i*/ /*p*/).

Onset/rime refers to the intrasyllabic level of speech structure. The onset all sounds in a syllable that precedes the vowel; the rime begins with the vowel and includes the remaining sounds in the syllable. In the word *float*, /*fl*/ is the onset, and /*oat*/ is the rime (Lane & Pullen, 1998).

Sight words are words that a reader can read automatically and accurately; when a reader sees the word, the spelling, meaning, and pronunciation are immediately activated in memory (Ehri, 1998a, 1998b).

Reader's lexicon refers to a set of word-specific representations in memory (Ehri, 1980, 1991, 1998b).

Alphabetic principle refers to the systematic relationship between letters and sounds. Understanding of the alphabetic principle is necessary for learning to read an alphabetic orthography.

Multisensory instruction refers to instruction that involves multiple senses, usually auditory, visual, and tactile-kinesthetic (Moats & Farrell, 1999).

CHAPTER 2
REVIEW OF RELATED LITERATURE

Introduction

Reading and literacy levels are highly predictive of social, academic, and economic success in our culture. In fact, low levels of literacy have been correlated to specific measures of socioeconomic status such as welfare dependency, teenage parenthood, low earnings, and unemployment (Baydar, Brooks-Gunn, & Furstenberg, 1993). However, according to the National Center for Education Statistics (1999), many children are not reaching reading proficiency. Scores reported in the 1998 Reading Report Card for the Nation indicated that 38% of fourth graders perform below the basic level of achievement in reading (National Center for Education Statistics, 1999). As defined by the National Assessment Governing Board (NAGB), the *basic level* refers to "*partial* mastery of prerequisite knowledge and skills that are fundamental for proficient work at a given grade level." The goal for all students is *proficient level* learning, or "*mastery* of the prerequisite knowledge and skills that are fundamental for proficient work at a given grade level " (NCES, 1999, p. 27). Given that only 31% of fourth graders achieved proficiency, 69% of students are at the basic level or below. Although this problem affects children from all backgrounds and socioeconomic conditions, it is more common among poor, nonwhite, and non-English speaking children (Snow, Burns, & Griffin, 1998).

These data are disturbing because low-achieving students who do not achieve grade level proficiency in the early grades typically remain below grade level throughout their schooling (Adams, 1990; Juel, 1988; Stanovich, 1986). In fact, the literacy knowledge and skills developed in early childhood are excellent predictors of children's future success in reading (Adams, 1990; Donaldson, 1978; Snow et al., 1998). Children who grow up in rich literate environments enter school with an advanced understanding of many of the concepts underlying reading (Adams, 1990; Snow et al., 1998) and may, in fact, already know how to read before they enter school. In contrast, recent research in the field of reading has provided compelling evidence that children who start off poorly in reading typically remain poor readers throughout their schooling and beyond (Adams, 1990; Foorman et al., 1997; Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996; Stanovich, 1986; Torgesen & Burgess, 1998). Stanovich (1986) described this phenomenon as the Matthew Effect—the rich get richer and the poor get poorer.

The Matthew Effect in reading seems to be perpetuated by the lack of practice poor readers receive in school. Allington (1983) reported that the amount students read in school depends upon their reading ability, with more able readers reading more often than their less able peers. For example, in January of the first-grade year, students in the high reading group averaged 51.9 words per session; the average reading group read 25.8 words per session; while the low reading group read only 11.5 words per session. The very children who needed the most practice received the least. In addition, the material that they read was often at a level too difficult (Allington, 1983; Stanovich, 1986, 1992; Walmsley & Allington, 1995) and failed to provide opportunities for students to develop effective word recognition skills. Research suggests that without repeated practice and exposure to print, students will not develop capacity-free word recognition and decoding skills (LaBerge & Samuels, 1974; Stanovich, 1986, 1992). Word recognition skills are "capacity-free" when the student can identify a word accurately and automatically without conscious attention to the decoding process and, thus, can focus attention on meaning. Without automaticity of word recognition, students will be unable to gain meaning from print, the ultimate goal of reading.

Chapter 2 provides a summary and analysis of the professional literature on the development of early word learning ability. In addition, it addresses the theoretical view of the reading process, the importance of the early acquisition of word recognition ability, and the core deficits of individuals with reading disability that cause barriers to successful reading acquisition. Chapter 2 also includes an explanation of the research base that contributed to the design of the intervention used in this study. This portion of the chapter includes a comprehensive review of the research studies conducted between 1985 and 1999. Studies selected for inclusion in this section were empirical studies that met the following criteria: (a) Subjects were in kindergarten through second grade; (b) outcome measures included assessment of word recognition or decoding skills; and (c) intervention was small-group or one-on-one instruction. In addition, seminal work published before 1985 was reviewed. The articles included were available through the Florida State University System Library Resources or were obtained directly from the authors.

Theoretical View of the Reading Process

To understand reading acquisition, it is first important to discern the processes involved in skilled reading. Rumelhart, Hinton, and McClelland

(1986) provided a framework for a theoretical model of the reading process based on Parallel Distributed Processing (PDP). Adams (1990) framed her view of the reading process on Connectionist Theory, which is a PDP model (Foorman, 1994; Seidenberg, 1990). The following sections describe how a PDP model works, and specifically how Adams's model of the reading process functions.

Parallel Distributed Processing and Connectionism

The concept of PDP is based on the belief that "intelligence emerges from the interactions of a large number of simple processing units, each sending excitatory and inhibitory signals to other units" (McClelland, Rumelhart, & Hinton, 1986, p. 10). In a PDP model, several components work together as a system. These components include (a) a set of *processing units*, (b) a state of *activation*, (c) an *output function* for each unit, and (d) a *pattern of connectivity* for each unit.

Each of the components within a PDP model plays an important role in the functioning of the system. The set of processing units represents particular concepts or abstract elements (e.g., phonology, orthography, semantics, and syntax). The state of activation simply represents the level of activity occurring within a unit or through the connections between units at any given time. Each unit within the system sends signals to the other units based on its output function. The degree to which output signals can be sent is determined by the state of activation. The signals that are sent to the other processing units are sent through a pattern of connections. The units send excitatory and inhibitory signals through the pattern of connectivity simultaneously or in *parallel* (Rumelhart et al., 1986).

In a PDP model or connectionist framework, learning is not based on rules but on a complex set of *connections* that are formed by the activation of each processing unit (Bereiter, 1991). The knowledge that guides the processing is in connections between units (McClelland, 1986). Apart from the connections, the individual processing units are actually meaningless (Foorman, 1994).

Adams's Model of the Reading Process

Adams (1990) based her theory of the reading process on the PDP model. She described a model of the reading process as a system of four processing units. The four units include the orthographic processor, the phonological processor, the meaning processor, and the context processor. Each processor is responsible for its independent function in reading, but the four processors must work simultaneously for the system to work efficiently. Furthermore, a pattern of connectivity exists in the model. Each unit or processor is systematically connected to the other units. It is through the pattern of connectivity that each processor sends and receives information (see Figure 1). Skilled readers efficiently use the system to gain meaning from print. That is, in skilled reading all four processors actively work together by performing their independent function and sending and receiving input from the other processors.

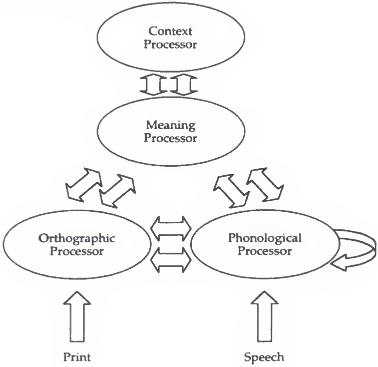
Central to the system is the meaning processor, as gaining meaning from print is the central purpose of reading; the other three processors surround the meaning processor. The system begins its work with the orthographic processor. The orthographic processor receives visual input from print and sends information to the meaning processor. For words that have already been learned by the reader, the meaning processor interprets the printed word by attaching a meaning stored in lexical memory. If the word encountered by the orthographic processor is not stored in lexical memory, then the phonological processor attaches a pronunciation to the printed word and the meaning processor then attaches meaning. The connectivity among the phonological, orthographic, and meaning processors is actually circular. After a word is perceived through the orthographic processor, the meaning processor arouses a pronunciation in the phonological processor; likewise, the pronunciation elicited from the phonological processor arouses meaning. A strong circular connectivity is crucial to the reading process.

The context processor is also an important unit within the system. The output function of the context processor is the facilitation of "ongoing coherent interpretation of text" (Adams, 1990, p. 138). In its simultaneous predictive work, the context processor speeds the work of the other processing units. The context processor also functions to confirm the work of the other processors, to select between alternate word meanings, and to emphasize word meanings that assist in the overall comprehension of the text. Together, the meaning and context processors work in parallel with the phonological processor to make sense of the orthographic information received from the written words. For fluent reading to occur, each processor must be prepared to send and receive information, and all four processors must be working together in parallel.

Development of the System

Because knowledge is "in the connections" (Rumelhart et al., 1986), it is important to strengthen the connections between all of the processors. If two processing units are simultaneously highly active, the connectivity between the

Figure 1. Adam's Model of the Reading Process



two units is strengthened. For example, if the phonological and orthographic processors are both highly active, then the connection between those two processors becomes stronger. The system works efficiently when all four processors are clearly linked to one another.

Understanding the nature of PDP models has significant implications for early intervention and the prevention of reading disabilities. First, if a reader has a deficit in a specific processor, then intervention should focus on the activation of that processor. Second, intervention should work to strengthen the pattern of connectivity within the system as a whole. In addition, understanding the problems an individual with reading disability experiences will assist in the development of effective reading interventions.

Core Deficits Causing Reading Disability

Unfortunately, some children experience great difficulty acquiring the reading process. Several factors have emerged from beginning reading research as central causes of reading disability. These core deficits are phonological processing, naming speed, and orthographic processing. The following sections describe these three core deficits and how they relate to difficulties in reading acquisition.

Phonological Deficit

There is growing consensus in the field of reading disabilities that the most common source of reading difficulty is a core deficit in phonological processing (e.g., Brady, 1997; Lennox & Siegel, 1994; Rack, Snowling, & Olson, 1992; Roberts & Mather, 1997; Tallal, Miller, Jenkins, & Merzenich, 1997; Torgesen, Wagner, & Rashotte, 1997; Wolf, Pfeil, Lotz, & Biddle, 1994; Wagner & Barker, 1994; Wolf, 1997). Torgesen et al. (1997) posited that two types of research support the phonological deficit view of reading disability. First, studies have shown that instruction in phonological awareness improves reading acquisition (e.g., Ball & Blachman, 1991; Foorman et al., 1996; Torgesen & Wagner, 1998). Second, studies also indicate that abilities in phonological awareness predict future success in reading (Adams, 1990; Badian, 1994; Rack et al., 1992; Torgesen et al., 1997).

The effect of a deficit in phonological awareness is that it impedes the acquisition of word recognition skills (Brady, 1997; Wolf, 1997), which is the primary difficulty experienced by students with reading disability (Torgesen et al., 1997). To acquire decoding ability, sensitivity to the sound structure of words is necessary (Foorman et al., 1997). Furthermore, awareness must be developed that the individual phonemes in words are represented by letters, and that those sounds can be analyzed and synthesized in the decoding process (Nicholson, 1997).

Naming-Speed Deficit

Research from the field of cognitive psychology has provided evidence that, along with a phonological processing deficit, individuals with reading disability have a core deficit in naming speed (Wolf, 1997; Wolf & Obregón, 1997). A naming-speed deficit refers to the inability to retrieve rapidly the spoken referent for a visual stimuli (Badian, 1997). Although naming-speed deficits have been considered by some to be part of a phonological deficit (see e.g., Näslund & Schneider, 1991; Wagner & Torgesen, 1987; Wagner & Barker, 1994), Wolf and her colleagues (Wolf, 1997; Wolf et al., 1994) argued that naming speed deficits affects reading acquisition independent from phonological processing (see also, Olson, Forsberg, & Wise, 1994). Data from languages with more regular orthographies (e.g., German) (Badian, 1997; Wimmer, Mayringer, & Landerl, 1998; Wolf et al., 1994) and a lack of correlation between naming-speed and phonological processes further support an independent deficit hypothesis (Felton & Brown, 1990; Wolf et al., 1994). Some researchers (e.g., Fawcett & Nicholson, 1994; Nicholson & Fawcett, 1994) even argue that both naming speed deficits and phonological deficits are part of a global deficit in automatization.

The effect of naming-speed deficits may be related to deficits in orthographic processing. If the letters in a word are identified slowly, then these letters will not become "activated in sufficiently close temporal proximity to allow the child to become sensitive to letter patterns" (Bowers, Golden, Kennedy, & Young, 1994, p. 203). That is, readers with naming-speed deficits may have difficulty establishing representations of letter sequences in memory (Ehri & Saltmarsh, 1995; Wimmer et al., 1998). An inability to retrieve rapidly and/or represent letter knowledge would, thus, limit the quality of the orthographic codes in memory (Berninger, 1991,1994).

Orthographic Deficit

The construct of an orthographic processing deficit in reading disability has received far less attention in the literature, and its impact is somewhat less clear. In fact, there is not yet agreement on a working definition of orthographic processing (Wagner & Barker, 1994). However, what is certain is that orthographic processing involves several varieties of orthographic knowledge. Berninger (1994) provided a summary of the various forms of orthographic knowledge that include (a) orthographic structure, (b) orthographic coding, (c) orthographic-linguistic mapping, (d) internal lexicon, and (e) metacognitive knowledge about the writing system.

Each form of orthographic knowledge contributes to reading acquisition. Orthographic structure refers to patterns in written language such as letters that occur in certain positions within words and letters that occur together regularly. Orthographic coding refers to procedures for creating unitary mental representations from print. Orthographic-linguistic mapping occurs when orthographic codes are connected to phonological codes. The internal lexicon is where word-specific orthographic images are stored in memory. Finally, metacognitive knowledge about the writing system includes understanding the basic concepts of print (Berninger, 1994). Research in the area of orthographic knowledge typically focuses on orthographic structure, coding, and linguistic mapping.

Recent studies have indicated that a third core deficit of individuals with reading disability may be related to orthography. A deficit in the orthographic processor would hinder the connectivity pattern between the orthographic, phonological, and meaning processors (Adams & Bruck, 1993). Furthermore, in order to secure words in lexical memory, a systematic relationship between orthography and phonology must be established (Ehri & Soffer, 1999). Clearly, orthographic information is crucial to the reading process.

In a prediction study (Badian, 1994), orthographic skills of kindergarten students accounted for 32% of the variance in reading scores in first grade, more than that of naming-speed or phonological awareness (1.6% each). Conners and Olson (1990) also reported contributions in word recognition variance independent of phonological processing in older students with reading disability. However, in another study (Badian, 1997), although a majority of students with dyslexia had orthographic, phonological, and naming-speed deficits, evidence was not strong enough to support an independent orthographic deficit in reading disability.

Development of Word Reading Ability

Although individuals with dyslexia may have different core deficits at the base of their disabilities, each deficit often manifests itself in the inability to recognize words accurately and automatically (Siegel, 1989; Torgesen et al., 1999). A primary difficulty of struggling readers is the inability to learn to read words by phonological recoding and, thus, to make appropriate connections to retrieve words from lexical memory. To determine how to provide effective intervention in decoding skill, it is important to understand how word reading ability develops. The following section outlines a series of phases in the development of word recognition abilities.

Ehri's Theory of the Development of Word Recognition Abilities

Linnea Ehri proposes a theory to explain how readers develop word recognition abilities. The ability to read words by sight is dependent upon the strength of the connections that have been developed between the orthographic and phonological processors (Adams, 1990). According to Ehri and Saltmarsh (1995), "readers read sight words by accessing connections that they have formed between letters in the spellings of specific words and phonemes detected in pronunciations" (p. 298). Readers who are able to use grapheme-phoneme connections are able to secure words in lexical memory (Ehri & Saltmarsh, 1995). During the development of the ability to apply grapheme-phoneme and orthographic knowledge, however, a reader progresses through a series of phases beginning with the logographic or visual cue phase (Ehri, 1987, 1991, 1992, 1997).

Prealphabetic phase. At the emergence of word reading ability, readers use a variety of visual cues to ascertain the identity of words; thus, Ehri (1991, 1992, 1998b) also referred to this phase as visual cue reading. During this phase of word reading ability, connections are formed between salient features of a word and the meaning of the word. The identification of the word occurs at the semantic rather than phonological level (Ehri, 1991) and may rely on irrelevant and unreliable cues. An association may be made between a logo and the printed word (e.g., the golden arches that are always paired with the word McDonald's) (Adams, 1990; Ehri, 1991; Reutzel, 1992; Snow et al., 1998) or the shape of the word and the word's meaning. Gough and Hillinger (1980) found that children used thumbprints on cards to help identify words (see also, Gough, Juel, & Griffith, 1992). During this early phase, grapheme-phoneme knowledge is not developed and cannot support the reader in identifying words. The circular connectivity described in Adam's model of the reading process is not yet developed.

The difficulty with word reading at this level is that the connections that are made between the visual feature selected and the word are arbitrary rather than systematic. Byrne (1992) called this method selective association. Selective association provides no way to learn a novel word, yet beginning readers encounter novel words on nearly every page they read. In addition, many words have visually similar features and are easily confused for visually similar words and the more words that are learned the more difficult it becomes to distinguish one word from another.

To become a skilled reader, the connections between the printed word and the word in memory must be based on grapheme-phoneme relationships. The English language is an alphabetic system. The symbols of the alphabet (graphemes) match sounds in speech (phonemes). These matches are systematic rather than arbitrary, and thus, the system is best described as a cipher rather than a code (Foorman et al., 1997; Gough et al., 1992; Gough & Hillinger, 1980). In the second phase of Ehri's developmental theory the reader begins to use letter-sound relations but is not yet able to use the full cipher.

Partial alphabetic phase. The second phase, partial alphabetic phase or phonetic cue reading, is characterized by the emerging use of grapheme-phoneme connections. Thus, rudimentary knowledge of the letters-sound correspondences in the English alphabet is necessary to enter into phonetic cue reading. Beginning readers in this phase use incomplete letter-sound correspondences to access words in memory. They may use the initial or final letter-sounds, ignoring the medial phonemes in the word, such as recognizing the word ball by the */b/* and the */l/*.

Although only partial alphabetic cues are being used to access words in memory, the access routes are systematic as opposed to the arbitrary access routes used in the visual cue phase. The systematic route in this phase is more reliable than logographic reading, but it is still insufficient for skilled reading to develop (Ehri, 1991, 1992, 1998, 1999). Like visual-cue reading, phonetic-cue reading does not provide the means to access unknown words from print.

Full alphabetic phase. In the third phase, referred to as full alphabetic or cipher reading, access to words in memory occurs through a process called phonological recoding. In phonological recoding, word identity is established through the use of the cipher; the graphemic representation of the word is converted into its phonological representation (Foorman et al., 1997; Hoover & Tunmer, 1993). In contrast to phonetic cue reading, connections are formed out of the "complete array of letters connected to the phonemic structure of the word" (Ehri, 1992, p. 134). For example, in a word with four phonemes such as *lift*, a reader at the full alphabetic phase would connect each letter to is corresponding phoneme to determine the correct pronunciation (Ehri, 1999). Consequently, the reliability of word recognition increases dramatically over that of reading in the phonetic cue phase. The ability to make use of the cipher, according to Gough et al. (1992), is the only means to becoming a proficient reader.

Consolidated alphabetic phase. The fourth phase marks the entrance into the most mature form of reading. In the consolidated alphabetic phase, readers begin to consolidate multiletter patterns in memory. That is, phonemes and graphemes in common spelling patterns are analyzed and bonded as a consolidated unit. The more often a reader has encountered a particular combination of letters, the stronger the orthographic processing of those combinations becomes, and the reader breaks words into chuncks at the weakest links (Adams, 1990). Instead of recoding words at the phoneme level, larger chunks might be used (e.g., syllables, onsets and rimes, or morphemes). Thus, connections to new words are more efficient. For example, if *–ing* is consolidated in memory from previous experiences reading words such as *king*, *sing*, or *ring*, then adding new words such as *bring* and *sting* to lexical memory will occur more readily (Ehri, 1998b).

Prerequisite Knowledge for the Development of Word Reading Ability

A large percentage of the variance in reading ability is attributable to word recognition and decoding skill (Stanovich, 1991). Learning to decode is an unnatural act of integrating a series of complex cognitive processes (Chard, Simmons, & Kameénui, 1998; Vellutino & Denckla, 1991). Several abilities are necessary before the integration of the processes is possible. The following section describes two skills that are each necessary and yet alone insufficient for mastery of reading an alphabetic language: (a) phonological awareness and (b) the alphabetic principle.

Phonological awareness. Over the past two decades, phonological awareness has received an overwhelming amount of attention in the reading research. Through this research, it has become clear that the inability to process language phonologically is the most common barrier to reading acquisition. Specifically, children need to understand the internal structure of words before they are able to benefit from formal reading instruction (Adams, 1990; Chard & Dickson, 1999; Liberman, Shankweiler, Fischer, & Carter, 1974). A lack of phonological awareness prevents the development of understanding about how print maps to speech—an understanding necessary for word recognition and decoding.

Phonological awareness refers to the conscious awareness of or sensitivity to the sounds of speech apart from their meaning (Lane & Pullen, 1998; Snow et al., 1998; Torgesen & Bryant, 1994). It includes the abilities to detect, isolate, manipulate, blend, or segment language at four levels. The four levels of phonological awareness are (a) word level, (b) syllable level (c) intrasyllabic level (onsets and rimes), and (d) phoneme level. According to Chard and Dickson (1999) phonological awareness requires a general understanding of all four levels of oral language.

The ability to manipulate phonemes, particularly blending and segmenting phonemes, plays a critical role in word recognition and spelling (Lundberg, Frost, & Peterson, 1988). The knowledge that spoken language can be broken into individual phonemes is a prerequisite to being able to decode (Adams, 1990; Blachman, 1991). The letters of our alphabetic system are mapped onto these segmented phonemes. Thus, an understanding of both the phonemic structure of spoken language and the relationship between that structure and the alphabetic principle is necessary in the development of literacy. With an understanding of how phonological awareness, particularly at the phoneme level, is related to reading, it is not difficult to see how this metalinguistic ability can effectively predict the success of a young child's reading development. It has been shown in numerous studies to do just that (Adams, 1990; Juel, 1988; Lomax & McGee, 1987, Snow et al., 1998; Tunmer & Nesdale, 1985).

Alphabetic principle. Although phonological awareness is a necessary foundational skill for reading acquisition, it is not sufficient for acquiring the ability to read words (Tunmer, Herriman, & Nesdale, 1988). In addition to skill in phonological awareness, understanding of the alphabetic principle is necessary for facilitation of word recognition and decoding skills (Chard et al., 1998). In fact, the alphabetic principle makes little sense to children with deficits in phonological awareness (Uhry & Shepherd, 1997).

In connection with phonological awareness, cognitive insight into the systematic relationship between printed letters and phonemes (i.e., the alphabetic principle) is a critical in reading an alphabetic language (Adams, 1990; Anderson, Hiebert, Scott, & Wilkinson, 1985; Byrne & Fielding-Barnsley, 1989; Haskell et al., 1992; Juel, 1991; Reutzel, 1992, Snow et al., 1998). Without an understanding of how print maps to speech, an individual would be unable to assign accurate pronunciations to novel print. Like phonological awareness, understanding the alphabetic principle does not assure reading mastery. A child may have an understanding of the alphabetic code but lack "an assembly routine or working memory space to construct word pronunciations" (Byrne & Fielding Barnsley, 1989, p. 313).

Research over the past two decades has provided a greater understanding of what is necessary for reading acquisition. We know from the research, for example, that "in order to enjoy a smooth entry into reading and writing, a child needs two things: an understanding of the principle of phonemic segmentation of speech, and knowledge of which letters represent which phonemes" (Byrne, Fielding-Barnsley, Ashley, & Larsen, 1997, p. 271). In the following sections, interventions that have investigated the acquisition of these skills are described.

Interventions for the Prevention of Reading Disability

The foremost consequence of weaknesses in phonological processing ability is difficulty understanding and applying the alphabetic principle in deciphering unknown words in print (Siegel, 1989; Torgesen et al., 1999; Torgesen, 2000). Early in the course of formal reading instruction, children with reading disabilities exhibit word level reading problems, and rarely do they acquire average-level skills in word recognition and decoding (Francis et al., 1996; Juel, 1988; Torgesen et al., 1999). Current research suggests that in order to ameliorate children's word reading deficits, early and intensive intervention should be implemented.

Numerous training studies have focused on improving word recognition and decoding skills in children in kindergarten through second grade. Several significant training studies are discussed in the following sections. In the studies reviewed in this section, the independent variables included tutoring, small-group instruction, training in phonological awareness, training in the alphabetic code, and training in various word-reading methods. The studies are organized in three sections: (a) phonological awareness interventions with decoding and word recognition as outcome measures, (b) decoding and word recognition interventions, and (c) Reading Recovery interventions. The Reading Recovery interventions are important to this review because they incorporate word reading strategies within the tutoring lesson.

Phonological Awareness Interventions

Bradley and Bryant (1983) conducted a training study to investigate the correlation between sound categorization ability and development of reading skills. Participants were 400 five-year old children. The results indicated that indeed low scores on the phonological awareness task did predict difficulty in reading acquisition.

In a follow-up examination, 65 of the children with deficits in sound categorization were randomly assigned to four groups: (a) sound categorization training, (b) sound categorization and letter-sound correspondence with plastic letters, (c) a control group that was taught to sort words based on semantic categories, and (d) a no treatment control group. After training, the group that received the combination of sound categorization and letter-sound correspondences performed significantly better than the other three groups. Though the results are limited due to a small number of children in each group, Bradley and Bryant concluded that sound categorization deficits are causally related to reading difficulties and that a combination of letter-sound correspondence training and phonological awareness training is superior to sound categorization training alone.

Ball and Blachman (1991) evaluated the effects of phonemic segmentation and instruction in letter names and letter sounds on reading and spelling skills of kindergarten students. This study was conducted to follow up a previous study (Bradley & Bryant, 1983) that resulted in the premise that combined phonological and letter-sound correspondence training is more effective than phonological awareness training alone. In the Bradley and Bryant study, however, a letter-sound only training group was not included. In the Ball and Blachman study, participants were 89 kindergarten students who were not already reading. Participants were randomly assigned to three groups that included (a) phonemic awareness paired with letter-sound correspondence training, (b) letter-sound correspondence training only, and (c) no treatment control group. The intervention included a 7-week training that consisted of 20-minute lessons implemented 4 times per week for the two training groups. Results indicated that combined phoneme segmentation and letter/sound training is superior to letter-sound correspondence training alone. This study was limited, however, in that it did not include a phonological training alone group.

Hatcher et al. (1994) also conducted a study in a follow-up to the Bradley and Bryant study. Although Bradley and Bryant's study included a relatively small number of participants in each group, they concluded that phonological awareness training paired with letter-sound correspondence was superior to training in phonological awareness alone. The limitations of the Bradley and Bryant study provided the impetus for the Hatcher et al. (1994) follow-up study.

Hatcher and his colleagues investigated three different interventions for students with reading disability to determine the relationship of phonological awareness training and reading improvement. The participants were 128 second-grade students exhibiting difficulties learning to read. The interventions included (a) reading with phonological awareness training, (b) reading alone, (c) phonological awareness alone, and (d) no treatment control. The results of the study help to clarify the causal relationship between phonological awareness training and reading improvement. On all reading posttest measures, the group who received reading with phonological awareness training significantly outperformed the other two experimental groups and the control group. Likewise, the combined reading and phonological awareness group made more progress in spelling than the other three groups. On arithmetic measures, however, no significant differences between groups existed at posttest. Furthermore, only one other group (reading alone) performed significantly better than the control on any measure and did so only on the Early Word Recognition test. Hatcher and his colleagues (1994) concluded that "in order to be effective in boosting reading skills the training of phonological and reading skills needs to be integrated" (p. 51). These findings support that of Bradley and Bryant (1983) and Tunmer et al. (1988) who deemed phonological awareness a necessary but not sufficient condition for reading.

Decoding and Word Recognition Interventions

Fielding-Barnsley (1997) investigated the effects of teaching whole word versus decoding and encoding methods for learning to read. Participants were 32 kindergarten students who had been trained "to a high level in phonemic awareness and alphabet knowledge" (p. 85). The children were randomly assigned to either the sight word-whole word group (WW) or the decoding and encoding group (DE). The DE group used plastic letters and flashcards in the decoding training. During individual instruction, the child would create a word, one letter at a time, with the plastic letters while saying the sound of the letter. The child would then manipulate the word by removing the onset and reading the remaining rime. Following the manipulation of the letters, the child would write the word from memory. In the WW group, the plastic letters were not used. Instead, the flashcards were used alone, and the child would learn the word as a lexical unit. The child would also write the word from memory after practicing the word on the flashcard. This procedure was continued until the children had learned to read a set of 10 specified words.

The DE group significantly outperformed the WW on reading and writing taught words, novel words, and pseudowords. The results of this study led to the conclusion that explicit instruction in decoding and encoding in addition to phonemic awareness and alphabet knowledge assist in the development of the ability to decode novel words. These findings also support the notion that phonological awareness is necessary but not sufficient for acquiring the alphabetic principle (Bradley & Bryant, 1983; Tunmer et al., 1988). However, this study was limited due to the fact that it took place over a short period of time, and the students learned only 10 words.

Ehri and Wilce (1987) also studied two methods for teaching kindergarten students (n=30) to read words. One group was taught to read words by means of the cipher (i.e., phonological recoding); the second group was taught letter-sound relationships but received no phonological recoding training. Analyses revealed that students taught to make use of the cipher could decode more nonsense words than the cue readers could. In fact, none of the cue readers could decode any of the nonsense words. In addition, on a word learning task, the cipher readers again outperformed the cue readers. Likewise, the cipher readers' performance was superior to the cue readers' performance on spelling tasks. Most important, cipher readers could read more words accurately and consistently. Ehri and Wilce concluded, "The ability to decipher print makes an enormous contribution to word-reading skill and word-spelling skill" (p. 10).

However, the short period of intervention—5 to 11 lessons—limited the findings of this study.

In a study conducted by Uhry and Shepherd (1997) students with phonological deficits were taught explicitly to apply phonological recoding skill. Participants were 12 first- and second-grade students with average intelligence who exhibited a significant discrepancy between IQ and two separate measures (i.e., phonological processing and decoding). All 12 students received a balanced reading tutorial that included explicit phonics and phonological awareness instruction. Students were coached to use phonological recoding skills when encountering an unknown word. The materials included both phonics-controlled text and literature. The 1-hour lessons took place 2 times per week for a period of 5 months. On average, students received 31.7 hours of tutoring. Tutors were graduate students who received course credit for the tutoring. Analyses conducted were both within-subject comparisons as well as group analyses. From the group analyses, Uhry and Shepherd found that significant increases in phonological awareness ability were associated with significant gains in ability to read words and nonwords. They concluded that the effects of dyslexia can be minimized through early remediation.

Through analysis of the individual data, Uhry and Shepherd (1997) examined variation in the response to treatment. However, patterns did not emerge in the individual data to explain treatment resistance. For example, two children who had similar pretest scores made similar gains in reading nonwords, but made little gain in reading sight words—one child had a naming-speed deficit and the other child did not. The child without the naming-speed deficit did have a lower phonological awareness score at pretest. The only conclusion made from the individual analysis was that the severity of some combination of phonological processing deficits appear to affect "the magnitude of gains by individual children and the ability of individuals to transfer what they know about phonological recoding in building a lexicon of easily identified sight words" (p. 119). Limitations of this study included (a) small number of participants and (b) instruction occurred only 2 times per week.

Ehri and Robbins (1992) conducted a study with 102 kindergarten and first-grade students to determine if beginning readers can learn to read words by analogy, using the rime units of known words to decipher unknown words in print. In their investigation, students were randomly assigned to two groups: (a) an analogy-training group and (b) a control group. Students in the analogy-training group and the control group received instruction in three training sessions. The two groups were taught to read a set of five CVC words and a set of transfer words. The transfer words had common rime patterns that matched the rime patterns of the word set taught to the analogy-training group.

Children in each group were classified as being either decoders or nondecoders, determined by their ability to read nonwords. Analyses were conducted on decoders and nondecoders independently. Decoders in the analogy-training group read more transfer words than did decoders in the control group. However, 90% of the nondecoders were unable to read any transfer words. Ehri and Robbins concluded that beginning readers can read words more easily when they share rime units with known words; however, in order to read novel words by analogy, the beginning reader must have some ability to recode phonologically. This study was limited in that it did not compare training in phonological recoding and analogy training. It was further limited in the brevity of the intervention, in that participants learned to read only two sets of five words.

An investigation by Haskell et al. (1992) examined the level of orthographic training that best facilitates improvement in word reading ability. Participants were 48 first-grade students randomly assigned to four groups: (a) phoneme level instruction with hand-held cardboard letters, (b) onset-rime level instruction with hand-held cardboard letters, (c) whole word level instruction with word cards, and (d) no treatment control group. Analyses revealed that both the phoneme level and onset-rime level training groups were superior to the whole word training and that no significant differences existed between the phoneme level and onset-rime level training groups. However, phoneme level-trained students read more regular words correctly, and the onset-rime group read more irregular words correctly. Haskell et al. (1992) concluded that a combination of phonological awareness and letter-sound correspondence training at either the onset-rime level or the phoneme level was more effective than a whole word method. Additionally, they found that the onset-rime level may be more effective for teaching children to read irregular words, while the phoneme level may be more effective for words with regular spelling patterns. As an instructional strategy, they deemed the combination of phonological awareness and hand-held letters effective, yet they did not have a group that received phonological awareness and letter-sound correspondences without hand-held manipulative letters. The effectiveness of manipulative letter-sound training and phonological awareness is a question for further investigation. Another limitation of the study is that it did not include a training group that received instruction in combined phoneme level/onset-rime level reading—a question that could be answered in future research.

Reading Recovery

Reading Recovery is a supplemental reading tutorial program for low achieving first-grade students developed in New Zealand by Marie Clay. The purpose of the program is to reduce significantly the number of children with reading and writing difficulties through early intervention (Clay, 1985,1993; DeFord, Fried, & Estice, 1991). Several components are included in a Reading Recovery lesson: (a) reading familiar stories, (b) measuring the student's progress in text reading, (c) working with letters, (d) writing a message or story, and (e) reading a new book. Although Reading Recovery has been considered an effective remedial program (Johnston & Allington, 1991), the research establishing its effectiveness has been questioned (Chapman & Tunmer, 1991; Iversen & Tunmer, 1993; Nicholson, 1989). The following section describes studies conducted to determine the effectiveness of Reading Recovery or modified versions of the program as an intervention for struggling readers.

Iversen and Tunmer (1993) investigated three interventions for struggling readers. The participants were 64 first-grade students at risk for reading disability as determined by a phonological awareness screening. The participants were carefully matched and assigned to one of three groups: (a) a standard Reading Recovery program, (b) a modified Reading Recovery program, and (c) a standard control intervention (e.g., Title 1 services provided in respective schools). The modified Reading Recovery intervention added explicit training in phonological recoding to the typical Reading Recovery lesson format. The standard intervention comprised small-group, out-of-class supplemental instruction in reading by a reading specialist (i.e., certified teacher with master's degree in reading).

Analyses revealed that on all measures, both Reading Recovery groups significantly outperformed the control group. At the time students were discontinued from tutoring, both sets of Reading Recovery students performed at similar levels. Of interest, however, is that the students in the modified Reading Recovery group who received explicit instruction in phonological recoding required significantly fewer lessons to reach discontinuation status than did the standard Reading Recovery students. The modified Reading Recovery group needed on average 41.75 lessons to reach discontinuation criteria, while the standard Reading Recovery group needed on average 57.31 lessons to reach the same criteria. Furthermore, follow-up testing eliminated the possibility that the greater number of lessons helped children in the standard Reading Recovery group consolidate emerging reading skills and, thus, later surpass the children in the modified Reading Recovery group. At the end of the first-grade school year, the two Reading Recovery groups performed at similar levels on all measures, with the children in the modified group slightly ahead on text level.

According to Clay (1985) instruction in the alphabetic code need not be explicit. Clay posits that children will naturally acquire an understanding of the alphabetic principle by reading connected text and through experiences in attempting to spell words. Iversen and Tunmer (1993) concluded from their investigation that children will learn to read more quickly when provided with systematic instruction that is designed to make them aware the alphabetic principle. Particularly for at-risk children, systematic instruction in phonological recoding skill is more effective than incidental instruction. Further, the inclusion of direct instruction in phonological recoding yields superior outcomes to reliance on writing activities as the primary means of developing knowledge of the alphabetic code. Furthermore, in follow-up analyses, "phonological recoding ability (as measured by pseudoword decoding) was the only variable at discontinuation that made an independent contribution to variability in word recognition ability at the end of the year" (p. 123).

Greaney, Tunmer, and Chapman (1997) investigated another modified version of the Reading Recovery program. The participants were 36 children with reading disability in New Zealand. Participants were randomly assigned to one of two intervention groups: (a) rime analogy training group or (b) item-specific training group. Both groups received tutorial instruction modeled after, but more flexible than, the Reading Recovery program. Each group received training on procedures for identifying unknown words encountered in the tutoring lessons. The rime analogy training group received explicit instruction in the use of rime spelling units. The rime spelling unit was introduced as the final rime of a word and a rime embedded in a word (e.g., *heat* and *heater* both contain the –eat rime unit). The item-specific training group received instruction that focused on the use of context cues for determining novel words. Both groups were on a 3-day training cycle, with each lesson taking 30 minutes to complete. The students received instruction for 11 weeks. Results indicated that the rime analogy training was more effective than the item-specific training that is encouraged in the Reading Recovery tutorial.

Greaney et al. (1997) also conducted a 1-year follow-up assessment. In follow-up assessment, the superior scores of the rime analogy group were maintained. In addition, 20 reading age-matched, nondisabled control students were assessed. Although the children trained in onset-rime analogies possessed sufficient knowledge at the intrasyllabic level of phonological awareness, they used this knowledge less than the normal readers did when reading unknown words. Greaney and his colleagues concluded that

> an initial focus on teaching orthographic units corresponding to rimes is a very useful first step in making disabled readers more aware of sublexical relationships between written and spoken words, and in helping them to overcome their tendency to focus on boundary letters at the expense of medial information. (p. 650)

In a study described in a previous section (Hatcher et al., 1994), a comparison between variations of a Reading Recovery program was investigated. A limitation of the Hatcher et al. (1994) study is related to the difficulty in disentangling activities within treatments that may have been responsible for the reading and phonological improvements. Although the combined phonology and reading treatment was clearly superior to either training technique alone, the features of the intervention that best promote improvement in reading skills remain vague. In the reading only treatment, emphasis was placed on reading appropriate level text, building up reading and writing vocabulary, and featured structured multisensory teaching techniques. Students in the reading with phonology group received lessons modeled after the Reading Recovery format (Clay, 1985) with added emphasis on phonological awareness. Because that lesson included repeated reading, letter identification, writing a story, and cutting up and reassembling the story, it is unclear which features of the lesson are necessary or sufficient to help improve reading and phonological skills for struggling readers.

Developing an Effective Intervention for Increasing Decoding Skill

Research has established the necessary content for effective interventions in the prevention and remediation of reading disability. However, questions still remain about the most effective teaching methods for promoting the acquisition of necessary skills. The following sections describe the components and methods for promoting the acquisition of decoding skill and suggest a method for investigation that is commonly used, yet has not received empirical support—the use of manipulatives in decoding intervention.

Instructional Components that Promote Understanding of the Alphabetic Principle and Acquisition of Decoding Skill

Consistent in the research literature is that phonological awareness skills and an understanding of the alphabetic principle are necessary for the acquisition of decoding ability. Numerous studies have investigated the most efficient means for improving these skills in young children. The research described in this review of the literature supports the use of interventions that include training in a combination of phonological awareness and letter-sound correspondences. Combination interventions have been proven superior to either phonological awareness training or alphabetic training alone (e.g., Bradley & Bryant, 1983; Fielding-Barnsley, 1997; Haskell et al., 1992; Hatcher et al., 1994; Uhry & Shepherd, 1997).

In addition to investigating the effectiveness of intervention variations in phonological awareness and the alphabetic principle, studies have examined the effects of decoding strategies at three levels: (a) whole-word level, (b) phoneme level, and (c) onset/rime level. Based on the findings of several reading researchers (Ehri & Robbins, 1992; Ehri & Wilce, 1987; Fielding-Barnsley, 1997;

Greaney et al., 1997; Haskell et al., 1992; Iversen & Tunmer, 1993; Uhry & Shepherd, 1997), instruction at the phoneme level and the onset rime level are both more effective than whole-word methods.

An investigation conducted by Haskell et al. (1992) compared all three levels and found no significant difference between the onset-rime level and the phoneme level in overall decoding ability. However, the onset-rime group was more successful decoding irregular words, and the phoneme level group was more successful decoding regular words. These findings suggest that a combined onset-rime level/phoneme level intervention may be effective in promoting skill in decoding both regular and irregular words.

Instructional Methods that Promote Understanding of the Alphabetic Principle and Acquisition of Decoding Skill

Empirical evidence supports interventions in phonological awareness and phonological recoding. However, an understanding of the instructional methods that promote these skills is less clear. Numerous studies have investigated successful reading intervention programs that incorporate several instructional methodologies making it difficult to disentangle which features of the instruction are most effective for promoting word reading skill. This section describes the features that may promote positive reading outcomes for children struggling to acquire reading skills.

Explicit instruction. Current research in reading suggests that instruction in the alphabetic principle and decoding should be explicit and systematic (Haskell et al., 1992; Uhry & Shepherd, 1997; Yopp & Singer, 1985). Byrne et al. (1997) supported the need for external-learner contribution in reading acquisition. Students may not automatically make the connection between graphemes (print) and phonemes (speech). Explicit instruction in the alphabetic principle and decoding leaves little to chance and ensures almost all students the successful acquisition of those skills (Moats, 1998). Explicit instruction provides students with a "real" relationship between the printed letter and the phoneme (Beck & Juel, 1992); thus, interventions to promote reading acquisition should include explicit instruction.

Instruction in a meaningful context. Explicit instruction does not mean that instruction should focus on teaching explicit rules. According to PDP models, the goal of learning is the strengthening of connections among processing units as opposed to the formation of explicit rules (Adams, 1990; Bereiter, 1991; McClelland, Rumelhart, & Hinton, 1986). Adams (1990) posited that instruction in a meaningful context is essential in reading instruction and that it is through applying skills in meaningful context that connections are strengthened. Carreker (1999) also suggested that new concepts should be introduced in the context in which they will be applied. Furthermore, practice in a meaningful context promotes the generalization of a newly acquired skill. Interventions should provide students with the opportunity to apply skills in the alphabetic principle and decoding in a meaningful context and should avoid teaching many letter-sound relationships in isolation (Beck & Juel, 1992; Chard & Osborn, 1999).

Manipulative materials. The use of manipulative materials in reading interventions has received little attention in the professional literature (Moats & Farrell, 1999) though multisensory instruction has been recommended by education experts for more than a century (Fernald & Keller, 1921; Moats & Farrell, 1999; Montessori, 1912; Orton, 1937). Several recent studies actually incorporated the use of manipulatives in decoding interventions, although the use of manipulatives was not isolated as an independent variable (e.g., Bradley & Bryant, 1983; Fielding-Barnsley, 1997; Haskell et al., 1992). However, manipulative instruction in mathematics has a strong research base supporting its use to teach abstract concepts at all age levels (Mercer & Mercer, 1998). Lambert (1996) provided a review of the literature that describes research supporting the use of manipulative instruction for concept development. Given the strong research base in the use of manipulatives in mathematics, a logical next step in the reading research is to determine specifically the effects of this specific component of reading intervention.

Implications for Research

The literature review in this chapter provided a theoretical and empirical basis for this study. Researchers have demonstrated that word recognition is the critical skill in reading acquisition and that phonological awareness abilities and an understanding of the alphabetic principle are necessary for the development of word reading skills. Empirical studies to date have provided knowledge of several components necessary for inclusion in an effective word recognition intervention; however, questions still remain about the importance of a multisensory component that is commonly incorporated in interventions. The purpose of this study was to determine the effectiveness of the use of alphabetic word work with manipulative letters on the reading skills of struggling first-grade students.

CHAPTER 3
METHODS AND PROCEDURES

Introduction

The purpose of this study was to determine the effects of manipulative alphabetic word work on first-grade students' reading acquisition. In Chapter 3, the methods and procedures of the study are presented. This chapter includes the research hypotheses, a description of the sampling procedures, subjects, and intervention site demographics. Succeeding sections of this chapter include details of the experimental design, instructional procedures, and treatment of the data.

Hypotheses

A study of the effects of manipulative alphabetic word work on reading acquisition was conducted. The intervention was implemented in small-group settings over a 10-week period. Tests of significance were run to answer the following question: What effects does using manipulative letters in a meaningful context have on reading acquisition of struggling first grade students? The following null hypotheses were tested at the .05 level of confidence.

H_1: There will be no statistically significant difference on measures of phonological awareness between the subjects who receive manipulative alphabetic word work in a meaningful context and those who do not receive manipulative alphabetic word work in a meaningful context.

H_2: There will be no statistically significant difference on measures of nonword decoding between the subjects who receive manipulative alphabetic word work in a meaningful context and those who do not receive manipulative alphabetic word work in a meaningful context.

H_3: There will be no statistically significant difference on measures of sight word reading between the subjects who receive manipulative alphabetic word work in a meaningful context and those who do not receive manipulative alphabetic word work in a meaningful context.

H_4: There will be no statistically significant difference on measures of passage reading fluency between the subjects who receive manipulative alphabetic word work in a meaningful context and those who do not receive manipulative alphabetic word work in a meaningful context.

H_5: There will be no statistically significant difference on measures of reading comprehension between the subjects who receive manipulative alphabetic word work in a meaningful context and those who do not receive manipulative alphabetic word work in a meaningful context.

Methods

Settings and Subjects

The purpose of this section is to describe the instructional settings where the intervention study took place as well as to provide a description of the subjects. Demographic details are provided for school sites and intervention groups. In addition, the procedures for sampling and assigning subjects to groups are provided.

School demographics. Nine school sites in two north central Florida districts were selected for this study. The schools were selected to represent a distribution of both low- and middle-income populations as well as minority populations. The socioeconomic level of the schools is based on the percentage of students in the school receiving free or reduced lunch. The specific percentage of students who participate in the free and reduced lunch program and percentage of nonwhite students enrolled in each school is reported in Table 1.

Table 1

Descriptive Information for Schools

School	Total Enrollment	% of nonwhite students	% of students that receive free or reduced lunch
1	613	38	37
2	528	70	85
3	731	45	44
4	617	75	81
5	458	80	82
6	370	56	76
7	783	32	22
8	501	43	47
9	469	85	87

Subject description. Ninety-eight first-grade students participated in this study. Students were systematically selected for participation in the study. All first-grade students in the nine schools were screened on an invented spelling test (described later in this chapter). Students who scored 25 points or below (out of a possible 40) were identified as possible participants. Students who had excessive absences based on school records—five absences in previous grading period—were eliminated from the pool. In addition, students who were already receiving supplemental reading support with magnetic letters were eliminated as potential participants. As required by the University of Florida Institutional Review Board, parental informed consent was acquired for the remaining students. The parental informed consent letter is provided in Appendix A.

The 98 students selected as study participants were randomly assigned to three groups: (a) treatment group, (b) comparison group, and (c) control group. The statistical software program, *Minitab*, was used to assign students randomly to the three groups. Each of the 98 students was listed alphabetically and assigned a number. *Minitab* randomly sorted the numbers and assigned an equal number of students to each treatment group. The demographics of each group are provided in Table 2. The pretest mean scores for all measures are provided in Table 3. The number of subjects assigned to groups from each school is provided in Table 4.

Research Instrumentation

Screening measure. All first grade students in participating schools were screened using a measure of invented spelling (see Appendix B). The classroom teacher administered this screening instrument as a class-wide assessment. The instrument contains 10 items that are administered as a

Table 2

Descriptive Information for Groups

	Experimental	Comparison	Control	Total
Gender				
Male	23	21	15	59
Female	10	11	18	39
Ethnicity				
White	8	9	7	24
Black	21	19	22	62
Hispanic	2	2	2	6
Asian	1	1	1	3
Other	1	1	1	3
Lunch Status				
Free	27	24	28	79
Reduced Pay	1	3	0	4
Full Pay	5	5	4	14

traditional spelling test. Each item is scored based on the phonological accuracy of the written response. Students' performance on this measure provides information on how well participants can hear the phonemes in words and represent the phonemes with an appropriate grapheme; it provides an overall estimate of phonological awareness abilities and knowledge of the alphabetic principle.

Table 3

Pretest Means for Experimental, Comparison, and Control Groups

Pretest Measure	Means for Treatment Group	Means for Comparison Group	Means for Control Group
General Verbal Ability			
Peabody Picture Vocabulary Test—Revised (Dunn, 1981)	76.485	80.633	76.242
Phonological Awareness			
Word Level	7.424	7.844	7.697
Syllable Level	10.515	10.188	9.849
Onset/Rime Level	10.576	10.281	11.606
Phoneme Level	10.849	9.718	10.970
Decoding			
CVC Words	9.152	8.906	9.061
CVC Nonwords	5.152	7.156	5.788
Letter-Sound Sequencing	6.3939	5.5625	6.4545
Sight Word Reading	23.000	26.781	21.273
Passage Fluency	15.485	14.969	15.697
Reading Comprehension	1.879	1.344	2.242

Table 4

Groups Assignment by School

School	Treatment group	Comparison Group	Control Group	Total
1	3	3	3	9
2	3	3	2	8
3	3	1	1	5
4	6	7	5	18
5	3	6	7	16
6	0	0	3	3
7	3	3	1	7
8	3	3	3	9
9	9	6	8	23
Total	33	32	33	98

Scoring the screening assessment. The invented spelling screening was scored based on the phonological accuracy of the written word. A total score of 40 was possible on the invented spelling measure. Students could receive up to 4 points for each written word based on the following scale. If the written word contained one or more accurately represented phonemes other than the initial phoneme, 1/2 point was earned. A written word that contained only the initial phoneme accurately represented, earned 1 point. Two points were earned for words that contained the initial phoneme and one other phoneme accurately represented. Three points were earned for words that contained the initial phoneme and two or more phonemes accurately represented. Finally, if the written word was phonologically accurate, 4 points were awarded.

Trained individuals scored the invented spelling assessment. The scorers were divided into two groups. During training, the groups scored practice items until 90% agreement was reached. When 90% agreement was reached, the screening assessments were scored. Two raters scored each assessment. Interrater agreement was 97% for the screening measure. Interrater agreement was determined by calculating the number agreements divided by the number of agreements plus the number of disagreements and multiplying by 100 (i.e., A/A+D x 100). On all disagreements, a third rater scored the screening. The author of the screening instrument served as the third rater on all disagreements.

Pretest Measures

Pretest measures assessed general verbal ability, phonological awareness, sight word reading, rapid letter naming, decoding of nonwords, decoding of words, decoding rate of nonwords, passage fluency, and reading comprehension. Descriptions of the assessment instruments are outlined in the following sections.

Verbal Ability

The Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn & Dunn, 1981) was administered to provide information about participants' verbal abilities as compared with other children of similar age. The PPVT-R is an individually administered, norm-referenced, wide-range test of hearing vocabulary for Standard American English. It is an achievement test that provides information on the acquisition of English vocabulary. It also provides a quick *estimate* of one aspect of verbal ability for English speaking individuals. It is a "reasonably good" measure of scholastic aptitude and can, therefore, be used in initial screenings to determine low and high ability students. The reliability coefficients for the PPVT-R are provided in Table 5. Reliability coefficients are provided only for the age groups represented in this study.

Table 5

Reliability Coefficients for the PPVT-R

Age Group	N	Reliability Coefficient
6-0 – 6-11	60	.78
7-0 – 7-11	39	.82

Phonological Awareness

The phonological awareness subtest of the Jump Start in Reading: Assessment of Early Literacy Development (Pullen, Lane, & Hayes, 1999) was administered to all subjects. This subtest measures phonological awareness at the word, syllable, onset and rime, and phoneme levels. The tasks include matching, detecting, blending, segmenting, and deleting word parts at each level of phonological awareness. The complete subtest is provided in Appendix C.

Decoding of Words and Nonwords

A series of assessments were used to measure participants' ability to decode both words and nonwords. The first measure assessed the ability to decode a set of common consonant-vowel-consonant words. The examiner showed the subject words printed on cards in a large, clear font. The test was untimed. The number of correctly decoded words was recorded. This task was repeated with a set of consonant-vowel-consonant nonwords. Again, the examiner showed the subject nonwords printed on cards in a large clear font.

The test was untimed. The number of correctly decoded nonwords was recorded. The word and nonword lists are provided in Appendix D.

The third measure administered to assess decoding ability was the letter-sound sequencing subtest of the Jump Start in Reading: Assessment of Early Literacy Development (Pullen et al., 1999). The purpose of this assessment is to determine whether a child can successfully sequence the phonemes in words using manipulative letters. The examiner begins by showing the child the letters (a, e, o, p, s, & t) and reviewing the sounds of those letters. The examiner then asks the student to form a total of ten words using the manipulative letters. The number of words spelled correctly is recorded as the letter-sound sequencing score. The letter-sound sequencing assessment is provided in Appendix E.

Sight Word Reading

A series of lists of high frequency graded sight words were used to assess sight word knowledge. Each participant was asked to read the series of words printed in large letters on individual word cards. The examiner showed the participant the card for approximately 3 seconds. The response was recorded on a separate sheet. Each participant continued reading through the lists until five words in any one list were read incorrectly. The total number of sight words read correctly was recorded as the Sight Word score. The high frequency word lists are provided in Appendix F.

Passage Fluency

The oral reading fluency of participants was measured using a first-grade passage from the Qualitative Reading Inventory II (QRI II; Leslie & Caldwell, 1995). Each subject was asked to read the passage as quickly and accurately as possible. Although students read the entire passage, the oral reading fluency score was attained in the first minute's reading. The subject's oral reading fluency score was recorded by documenting the number of correct words read in 1 minute.

Reading Comprehension

The reading comprehension score was attained using the same passage as used in the passage fluency pretest. After students read the passage orally, subjects were asked to retell the story in their own words. The QRI II (Leslie & Caldwell, 1995) has a list of story details for the passage. The number of correct story details the participant included in the retelling was recorded as the story comprehension score.

Posttest Measures

Students were assessed in phonological awareness, sight word knowledge, rapid letter naming, decoding skills, passage fluency, and reading comprehension at posttest. In addition to the criterion measures that were used at pretest, two subtests of the Woodcock Diagnostic Reading Battery (WDRB; Woodcock, 1997) were administered at posttest to provide a standardized measure on specific reading skills. Each subtest administered is described in this section. Reliability coefficients for the WDRB subtests are provided in Table 6.

The Word Attack subtest of the WDRB was administered to all students. In this subtest, the subject read aloud pseudo words that followed logical spelling patterns in the English language. The pseudo words were read until the ceiling was reached. The number of correct responses when the ceiling was reached was recorded as the score for Word Attack subtest.

The Woodcock Diagnostic Reading Battery—Letter-Word Identification Subtest was administered to assess subjects' knowledge of letter names and sight words. The items in this subtest measure the subject's reading skills with isolated letters and words. The words become gradually more difficult as they include less frequent and irregularly spelled words. The student continues until the ceiling on the test is reached. In this study, after the participant reached the ceiling, the number of correct responses was recorded for the Letter-Word Identification Subtest score.

Table 6

Reliability Coefficients for the Woodcock Diagnostic Reading Battery Subtests

Subtest	n	r
Letter-Word Identification	234	.966
Word Attack	201	.938

Social Validity Measures

In addition to the related literacy assessments, social validity measures were administered to determine the acceptability and viability of the intervention. Wolf (1978) introduced the issue of social validity and recommended its use to prevent the possible rejection of a programmed intervention. Social validity refers to the acceptability or viability of a programmed intervention (Schwartz & Baer, 1991). The social validity measures for this study focused on both intervention procedures and outcomes. Each measure is described in the following section.

Social validity of program procedures. The intervention in manipulative alphabetic word work was designed for classroom teacher use. Although many reading interventions are designed to be implemented in a one-on-one tutoring format, this program is designed for small groups—a design more likely to be used by classroom teachers. Because ultimately the goal is for classroom teachers to implement this intervention, it was important to gather feedback on the acceptability of the intervention. Two types of procedural validity data were gathered: (a) study instructor feedback and (b) classroom teacher feedback.

Instructors who implemented the intervention during this study completed feedback forms at the conclusion of the study. Feedback forms focused on instructional procedures that worked well and procedures that needed to be improved. The instructor feedback form is provided in Appendix G.

Many of the instructors who implemented the intervention were pre-service graduate student teachers. Because only two classroom teachers implemented the intervention, additional procedural validity data were gathered based on videotaped lessons. The lesson videotape was divided into four sections with a title screen introducing each step of the lesson. In addition to watching the video, classroom teachers who wished to observe the intervention implementation were invited to do so. Classroom teachers completed procedural acceptability forms that asked for feedback on procedures and the likelihood that they would implement the intervention in their classrooms. The classroom teacher feedback form is provided in Appendix H.

Social validity of program outcomes. According to Fawcett (1991), social validity techniques should include methods for participant self-reporting of social validation. The subjects who participated in the study provided feedback on the intervention through a postintervention interview. The interview focused on participant perception of the effectiveness of the manipulative letter work. Interviewers provided letters to the student so that the student could demonstrate how he would use what he learned in the study in his reading. The participant interview questions are provided in Appendix I.

Experimental Design

An experimental pretest-posttest design was employed for this study with three groups: (a) treatment group, (b) comparison group, and (c) control group. This study required three groups to control for confounding variables. The treatment group received a four-step intervention implemented in a small-group setting. The comparison group controlled for the small-group supplemental support provided to the treatment group. That is, if significant differences were noted in the treatment group, without the comparison group, it would be difficult to disentangle the effects of small-group supplemental support and alphabetic word work with manipulative letters. The comparison group helped to eliminate possible confounding variables (i.e., functional relationship between treatment itself, or extra attention provided in a small-group setting). In addition, the comparison group allowed for the isolation of the independent variable, alphabetic word work with manipulative letters. Because the treatment and comparison interventions were identical with the exception of the alphabetic word work with manipulative letters, differences in means at posttest can be attributed to that variable. The control group served as a no-treatment control and received no supplemental instruction. They continued to receive reading instruction from school personnel. A summary of the experimental design is provided in Table 7.

Table 7

Experimental Design

Group	Procedures			
Treatment Group	R	O^1	X^1 (intervention with manipulative letters)	O^2
Comparison Group	R	O^1	X^2 (intervention without manipulative letters)	O^2
Control Group	R	O^1	(no treatment)	O^2

R = Random Assignment, O^1 = Pretest, X^1 = Treatment intervention, X^2 = Comparison intervention, O^2 = Posttest

Instructional Procedures

The instructional procedures for the study are described in this section. Instructor preparation is described for both the comparison group and the treatment group. Methods for ensuring treatment fidelity are also described.

Instructor Preparation

The instructors for this study included certified teachers in the Alachua and Marion school districts and graduate students in the College of Education at the University of Florida. Each instructor was required to attend extensive training in the instructional methodology employed in this study. Each instructor was provided a training manual. Before instructors began the intervention phase, mastery of the instructional procedures was demonstrated. In addition, each instructor agreed in writing to adhere to the procedural guidelines described in the training sessions. A minimum of three observations was conducted on each instructor for each group (i.e., experimental and comparison) to ensure procedural reliability. Procedural reliability was also strengthened by the provision of step-by-step lessons that the instructors followed for the treatment and comparison groups. The lessons are provided in Appendix J.

Materials

Books. The lessons for the experimental and comparison groups required books that were accessible to struggling first grade readers. Titles from the PM Story Collection from Rigby Education were selected for the study. The books contained interesting stories with simple sentences, supported by colorful illustrations. The titles are carefully leveled following the Reading Recovery leveling system. An explanation of the leveling system used by Reading Recovery is provided in Appendix K. Thirty titles were carefully selected based on their use of high frequency vocabulary and decodable words with common rime patterns. The 30 titles comprised three books at each level from 1 to 10. The same books were used for both the experimental and comparison groups. A complete reference list of intervention books is provided in Appendix L.

Manipulative materials. The lessons for the treatment group required magnetic letters and magnetic boards. To avoid the addition of unrelated variables, the magnetic letters selected were solid white, simple, san serif letters. The magnetic boards were also solid in color. Each instructor was provided enough letters and magnetic boards for each student in the treatment group. The comparison group did not use the magnetic letters or letter boards.

Treatment Group Intervention

The treatment group received a four-step intervention that included manipulative alphabetic word work in a small-group setting (i.e., three students).

The lessons began with a level 1 book and progressed in order through 10 levels. The same lesson format was followed for all 30 lessons. This section provides a description of the instructional procedures for the treatment group for all four steps of the lesson.

Step 1: Introducing the book. In *Step 1* of the lesson, the instructor introduced the book to the students in the group. The book introduction is an important aspect of the intervention session. A book introduction provides children better access to a new story so that they can read it fluently and independently on their first attempt (Clay, 1991). In addition, students should realize that a good reader thinks about a book before beginning to read it. As recommended by Hayes, Lane, and Pullen (1999), to develop this habit and to build and activate the student's background knowledge before reading, the instructor and the students looked through the book and talked about it.

Because learning occurs best through social interaction, the book introduction should be conversational in nature—book introductions are an authentic social interaction about the new book (Clay, 1991). During this introduction, the focus is on the pictures, not on the text. The instructor helped the student notice relevant features in the illustrations, make predictions about the story, and relate the content of the story to the student's life (Hayes et al., 1999). When the instructor introduced the book, she

1. Encouraged students to respond to the book by pointing out illustrations and link it to other familiar stories or topics.

2. Shaped the plot or structure the sequence to the climax, leaving the ending a surprise and provide a backdrop for anticipating what would occur in the text.

3. Used and *deliberately enunciated* novel language features (e.g., names, difficult language, language not used or uncommon in their culture, and syntactically confusing language).

4. Drew on children's background knowledge and introduced new knowledge.

5. Modeled common sentence patterns repetitively and encouraged children to repeat it.

6. Noticed parts of the text that could prove difficult for the children—provided support without giving words.

7. Encouraged students to be active participants in the conversation (Clay, 1991).

Step 2: Coaching students through the book. After the instructor introduced the text, the students read the book together with the instructor providing coaching as needed. During the sequence of the sessions, the nature of the coaching that the instructor provided changed from extremely explicit to more implicit.

During early sessions the instructor demonstrated strategies and modeled for the student what to do to figure out an unfamiliar word. Gradually, as the students gained the ability to determine effective strategies on their own with some prompting from the instructor, the coaching became less explicit. The goal was for the students to use effective strategies independently.

Coaching the group through the books helped familiarize students with the various sources of information in text that can be used to identify an unfamiliar word: letters, meaning, and syntax. The most useful source of information for reading is the letters. To use this orthographic information effectively, the students must be able to recognize the appropriate sounds associated with the letters in the word and blend the sounds together.

The instructor helped the student develop these skills in numerous ways. For example, when the students encountered an unfamiliar but decodable word, the instructor used magnetic letters to help the student see how each letter in the word represents a sound and how the letters come together to form the word. The instructor also helped the student relate the word to a similar word he already knew and pointed out the similarities and differences. For longer words, the instructor demonstrated how to cover up parts of the word to decode one part at a time.

The other sources of information, meaning and syntax, are used primarily to predict and confirm that the student's decoding was accurate. The instructor taught the students to use meaning to predict the identity of a difficult word by prompting him to continue reading and think of a word that would fit. The student must then decode the word to check the prediction. Ideally, the student learns to use meaning and syntax to confirm that a word was decoded correctly. The instructor can prompt this strategy by asking, "Does that word make sense there?" If the students decoded a word incorrectly and the word they said violates rules of syntax, the instructor prompted the students by asking, "Does that word sound right?" However, the primary focus for determining novel words in text was on phonological recoding.

Because the intervention was implemented in small groups, the students read the book together through choral reading. To ensure that all students followed along, the instructor insisted that each child pointed to the words in the text. Instructors were taught to prompt the students by asking them to point to the first word on the page and say, "Ready? Read." As students became more competent at choral reading, the instructor eliminated the prompting.

Step 3: Manipulative alphabetic word work. After coaching the students through the book, the instructor guided the group in manipulative alphabetic word work. The words for each session were previously selected and provided in the lesson manual. Each lesson included manipulative alphabetic word work with two decodable words and one high frequency sight word. Many of the high frequency sight words provided practice with irregular word patterns. The alphabetic word work was taken from meaningful, connected text. The instructor taught the students to use magnetic letters to help them understand how letters come together to form words. Students formed key words using the magnetic letters and then manipulated the letters to form new words. Throughout the early levels, students focused on changing only onsets, then progressed to changing the final phoneme, and finally changed medial phonemes. Each lesson was predesigned so that the instructor had few decisions to make during the session. Because lessons were predesigned, the instructors were consistent in the presentation.

During the magnetic word work portion of the session, the instructor:

1. Demonstrated how the letters come together to form the word, modeling the *segmentation* and *blending* of phonemes.

2. Focused on the *onset-rime level* and the *phoneme level* when blending and segmenting the words.

3. Encouraged students to segment and blend phonemes of words both as a *choral response* and *independently*.

4. Pointed out similarities and differences between the new word and a word the students already knew or that had been practiced in a previous session.

5. Prompted students to practice words and nonwords—talked explicitly about the difference between words and nonwords.

6. Prompted students to locate the words they made in the book they read for that lesson.

Step 4: Rereading the book. In the final step of the lesson, the students apply their skills in a rereading of the text. The students read the book in unison; the instructor provides support as needed. However, the purpose of this step is to provide an opportunity for uninterrupted reading of meaningful, connected text and for the application of newly practiced decoding skills.

Comparison Group Intervention

The students in the comparison group worked in a small-group setting (three students) and read, with coaching, the same texts that were read by the treatment group. This helped eliminate confounding variables and establish whether a functional relationship exists between the treatment and the outcome measures, rather than the extra attention provided in a small-group setting. The intervention for both the treatment and comparison groups was supplemental to their classroom reading instruction.

The same steps as the treatment group, excluding the alphabetic word work, were implemented in the comparison intervention. The instructors followed steps 1, 2, and 4, providing explicit instruction in phonological recoding. In step 2 of the lesson, coaching the students through the book, the instructor emphasized segmenting words into phonemes and blending those sounds together to determine the pronunciation of the word. The instructor did not use manipulative alphabetic word work in any portion of the intervention.

Control Group

This group served as a true no-treatment control. The only reading intervention this group received was the instruction that occurred in their regular classroom or supplemental work that was provided by school personnel. The control group students participated in all pretest and posttest measures.

Fidelity of Treatment

Observations were conducted throughout the course of the study to establish that the independent variable was present in the treatment group only and not in the control or comparison groups. In addition, the observations ensured that the intervention was implemented consistently and followed the procedures outlined in the design of the study. Each instructor for the treatment groups and the comparison groups was observed a minimum of three times throughout the study. A checklist was used to indicate that all steps in each intervention were followed. The checklist for both the treatment and comparison groups is provided in Appendix M. The fidelity of treatment score was 100% for all instructors.

Treatment of the Data

The data were analyzed to determine if any significant differences existed on outcome measures between the treatment group (manipulative alphabetic word work in a meaningful context), the comparison group (small group reading support using meaningful connected text but without manipulative alphabetic word work), and the no-treatment control group. Pretest data were collected on each participant at the beginning of the study. The group means on all pretest measures were compared to determine if significant differences between groups existed.

The pretest measures were used as covariates, and a series of analyses of covariance (ANCOVA) were conducted on each of the dependent variables: (a) phonological awareness, (b) nonword decoding, (c) sight word reading, (d) passage fluency, and (e) reading comprehension. The comparisons made for each hypothesis is illustrated in Table 8.

Table 8

Design for Testing the Null Hypotheses using a Series of Analyses of Covariance (ANCOVAs)

Dependent Measures	Treatment group		Comparison Group		Control Group	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
Phonological Awareness	H_1: There will be no statistically significant difference between groups on measures of phonological awareness.					
Nonword Decoding	H_2: There will be no statistically significant difference between groups on measures of nonword decoding.					
Sight Word Reading	H_3: There will be no statistically significant difference between groups on measures of sight word reading.					
Passage Fluency	H_4: There will be no statistically significant difference between groups on measures of passage fluency.					
Reading Comprehension	H_5: There will be no statistically significant difference between groups on measures of reading comprehension.					

CHAPTER 4
RESULTS

Introduction

The purpose of this study was to examine the effects of alphabetic word work with manipulative letters on the reading skills of first-grade students. Specifically, this study targeted students at risk for reading disability. The investigation examined the effects of the intervention on the following reading skills: (a) phonological awareness, (b) decoding skills, (c) sight word knowledge, (d) reading fluency, and (e) reading comprehension. Five hypotheses were formulated and tested. The primary question of the study was as follows: What are the effects of using manipulative materials in a meaningful context on the reading skills of struggling first-grade students?

To answer this research question, the performance of three groups was compared. The treatment group received explicit instruction in decoding, in a meaningful context, and with the incorporation of manipulative alphabetic word work. The comparison group received identical lessons with explicit instruction in decoding, without the use of manipulative letters. Finally, the control group did not receive supplemental instruction from the researcher of this study.

This chapter provides the results of the statistical analyses of the data from this study. In addition to statistical analyses, results from social validity measures and procedural reliability are included.

Statistical Analyses of Data

Group means on all pretest measures were calculated. To determine if group differences existed at pretest, a one-way analysis of variance (ANOVA) was used. Analyses revealed that no significant differences between groups existed on any pretest measure. Table 9 provides a summary of the one-way ANOVA of pretest means.

A series of analyses of covariance (ANCOVA) was conducted on the following dependent measures: phonological awareness, sight word reading, letter-sound sequencing, passage reading fluency, and reading comprehension. Each corresponding pretest measure served as a covariate. Because each measure represented a separate construct (Huberty & Morris, 1989), and because random assignment minimized group differences on pretest (Keppel, 1982), the use of multiple ANCOVAs was appropriate. For all dependent measures, the data are provided in Appendix N.

For the criterion measures of decoding ability, a multivariate analysis of covariance (MANCOVA) was conducted. The two related dependent variables included decoding of consonant-vowel-consonant (CVC) words and CVC nonwords.

In addition to the criterion measures, two subtests of the Woodcock Diagnostic Reading Battery were administered at posttest only. An ANOVA was conducted for each the Word Attack subtest of the WDRB. An ANCOVA was conducted for the Word Identification subtest of the WDRB with the PPVT-R as a covariate.

A description of the results for each measure is described in the following sections. The results are organized by the five constructs of the original

Table 9

Summary of ANOVA of Pretest Means

Pretest Measure		df	F	*p*
PPVT-R	Between	2	.695	.501
	Within	93		
	Total	95		
Word Level	Between	2	.275	.761
	Within	95		
	Total	97		
Syllable Level	Between	2	.494	.612
	Within	95		
	Total	97		
Onset/Rime Level	Between	2	2.399	.096
	Within	95		
	Total	97		
Phoneme Level	Between	2	.704	.497
	Within	95		
	Total	97		
Total PA	Between	2	.681	.509
	Within	95		
	Total	97		
Sight Words	Between	2	.361	.698
	Within	95		
	Total	97		
Decoding-CVC	Between	2	.011	.989
	Within	95		
	Total	97		
Decoding-Nonwords	Between	2	.815	.446
	Within	95		
	Total	97		

Table 9–continued.

Pretest Measure		df	F	*p*
Rapid Letter Naming	Between	2	.786	.458
	Within	95		
	Total	97		
Letter-Sound Sequencing	Between	2	.991	.375
	Within	95		
	Total	97		
Fluency	Between	2	.015	.985
	Within	95		
	Total	97		
Comprehension	Between	2	.732	.484
	Within	95		
	Total	97		

hypotheses: (a) phonological awareness, (b) decoding, (c) sight word knowledge, (d) reading passage fluency, and (e) reading comprehension.

Phonological Awareness

Four pretest and posttest measures of phonological awareness were administered. A series of ANCOVAs was conducted to determine if significant differences between groups existed at posttest. The four measures included the four levels of phonological awareness: (a) word, (b) syllable, (c) onset/rime, and (d) phoneme. Each skill of phonological awareness is considered as a separate construct, therefore, each ANCOVA is treated separately.

At the word level of phonological awareness, initial analyses indicated a covariate by treatment interaction (F = 6.852, 2, 92, p = .002). Therefore, the ANCOVA could not be conducted without the interaction term. The summary of the ANCOVA is provided in Table 10. The analysis of the interaction effect revealed that for students with lower-end scores on pretest, students in treatment group scored better on posttest. However, for students with higher-end scores on pretest, groups had similar performance.

For phonological awareness at the syllable level, initial analysis revealed no treatment by covariate interaction (F = 1.034, 2, 92, p = .360). Therefore, the ANCOVA was run with the interaction term removed. The summary of the ANCOVA is provided in Table 11. The analysis revealed significant group differences (F = 4.518, 2, 94, p = .013) thus, post hoc comparisons were conducted. Pairwise comparisons revealed significant differences between the treatment and control groups (p = .010). No other mean differences were significant. The summary of the post hoc comparisons is provided in Table 12. In addition, the adjusted group means are provided in Table 13.

Table 10

Summary of ANCOVA for Word Level Phonological Awareness

Source	Type III Sums of Squares	df	Mean Square	F	p
Corrected Model	109.919	5	21.984	15.084	.000
Intercept	274.731	1	274.731	188.507	.000
Group	26.071	2	13.036	8.944	.000
Word	73.962	1	73.962	50.749	.000
Group*Word	19.972	2	9.986	6.852	.002*
Error	134.081	92	1.457		
Total	8182.000	98			
Corrected Total	244.000	97			

* Significant at the p< .05 level.

Table 11

Summary of ANCOVA for Syllable Level Phonological Awareness

Source	Type III Sums of Squares	df	Mean Square	F	p
Corrected Model	194.553	3	64.851	21.198	.000
Intercept	390.677	1	390.677	127.699	.000
Syllable	151.799	1	151.799	49.618	.000
Group	27.644	2	13.822	4.518	.013*
Error	287.580	94	3.059		
Total	15945.000	98			
Corrected Total	482.133	97			

* Significant at the p< .05 level.

Table 12

Pairwise Comparisons for Syllable Level Phonological Awareness

Group I	Group J	Mean Difference (I-J)	Std. Error	p
Treatment	Treatment			
	Comparison	.556	.434	.611
	Control	1.297*	.433	.010
Comparison	Treatment	-.556	.434	.611
	Comparison			
	Control	-.740	.435	.275
Control	Treatment	-1.297*	.433	.010
	Comparison	-.740	.435	.275
	Control			

* Significant at the $p < .05$ level.

Table 13

Adjusted Group Means for Syllable Level Phonological Awareness

Group	Mean	Standard Error	N
Treatment	13.180	.305	33
Comparison	12.623	.309	32
Control	11.883	.305	33

The third level of phonological awareness is the onset-rime level. Initial analysis revealed no treatment by covariate interaction ($F = .206, 2, 92, p = .814$). The ANCOVA without the interaction term reached significance ($F = 3.640, 2, 94, p = .030$), thus post hoc comparisons were conducted. However, due to the conservative nature of the pairwise comparisons, mean differences between groups did not reach significance. The summary of the onset-rime level

ANCOVA is presented in Table 14, and the post hoc comparison summary is provided in Table 15. The adjusted group means are provided in Table 16.

Table 14

Summary of ANCOVA for Onset-Rime Level Phonological Awareness

Source	Type III Sums of Squares	df	Mean Square	F	p
Corrected Model	286.454	3	95.485	34.640	.000
Intercept	125.738	1	125.738	45.616	.000
Onset	284.785	1	284.785	103.315	.000
Group	20.067	2	10.033	3.640	.030*
Error	259.108	94	2.756		
Total	15313.000	98			
Corrected Total	545.561	97			

* Significant at the p< .05 level.

Table 15

Pairwise Comparisons for Onset-Rime Level Phonological Awareness

Group I	Group J	Mean Difference (I-J)	Std. Error	p
Treatment	Treatment			
	Comparison	.037	.412	1.000
	Control	.998	.414	.054
Comparison	Treatment	-.037	.412	1.000
	Comparison			
	Control	.961	.421	.075
Control	Treatment	-.998	.414	.054
	Comparison	-.961	.421	.075
	Control			

Table 16

Adjusted Group Means for Onset-Rime Level Phonological Awareness

Group	Mean	Standard Error	N
Treatment	12.624	.289	33
Comparison	12.586	.296	32
Control	11.626	.294	33

The final measure of phonological awareness was an assessment at the phoneme level. The initial analysis indicated that no treatment by covariate interaction existed (F = 1.405, 2, 92, p = .251), thus the ANCOVA was run again without the interaction term. The summary of the ANCOVA is reported in Table 17. Analyses revealed a significant group difference (F = 3.094, 2, 94, p = .050). In follow-up comparison, reported in Table 18, mean differences at posttest did not reach significance. Although mean differences did not reach significance, the adjusted mean for the treatment group was higher. The adjusted group means are reported in Table 19.

Decoding

Two criterion measures of decoding (i.e., phonological recoding) were administered at pretest and posttest. A test of significant differences between groups was conducted using a series of ANCOVAs. Because each dependent measure had a separate covariate, two ANCOVAs were and the results were analyzed through a Bonferroni correction procedure. For the Bonferroni correction procedure, the alpha level was divided by the number of comparisons ($\alpha = .05/2=.025$). The interaction term was not significant (F=3.315, 2, 92, p = .041) so the ANCOVA was run again with the interaction term removed.

Table 17

Summary of ANCOVA for Phoneme Level Phonological Awareness

Source	Type III Sums of Squares	df	Mean Square	F	p
Corrected Model	774.435	3	258.145	26.574	.000
Intercept	1184.086	1	1184.086	121.895	.000
Phoneme	674.792	1	674.792	69.466	.000
Group	60.118	2	30.059	3.094	.050*
Error	913.117	94	9.714		
Total	22788.000	98			
Corrected Total	1687.551	97			

* Significant at the p< .05 level.

Table 18

Pairwise Comparisons for Phoneme Level Phonological Awareness

Group I	Group J	Mean Difference (I-J)	Standard Error	p
Treatment	Treatment			
	Comparison	1.827	.777	.063
	Control	1.433	.767	.195
Comparison	Treatment	-1.827	.777	.063
	Comparison			
	Control	-.394	.778	1.000
Control	Treatment	-1.433	.767	.195
	Comparison	.394	.778	1.000
	Control			

Table 19

Adjusted Group Means for Phoneme Level Phonological Awareness

Group	Mean	Standard Error	N
Treatment	15.752	.289	33
Comparison	13.926	.296	32
Control	14.320	.294	33

The results of the ANCOVA for decoding CVC words and nonwords were also adjusted using the Bonferroni correction procedure ($\alpha = .05/2 = .025$). For CVC words, analysis revealed significant group differences (F = 4.530, 2, 94, p = .013). The summary of the ANCOVA is provided in Table 20.

Because the ANCOVA revealed significant group differences, follow-up pairwise comparisons were conducted. The summary of pairwise comparisons is provided in Table 21. Pairwise comparisons revealed no significant difference between the control group and the comparison group (p = 1.0). However, the treatment group significantly outperformed the comparison group (p = .022). No significant difference was indicated between the control group and the treatment group (p = .051). Adjusted group means are provided in Table 22.

In the second ANCOVA procedure for decoding nonwords, only decoding nonwords and group were significant, thus, the interaction term was removed. The results of the ANCOVA revealed significant differences for decoding nonwords and group (F = 6.921, 2, 94, p = .002). The summary of the

ANCOVA is provided in Table 23. The ANCOVA reached significance at the .025 level, after the Bonferroni correction.

Table 20

Summary of ANCOVA for Decoding CVC Words

Source	Type III Sums of Squares	df	Mean Square	F	p
Corrected Model	1148.403	3	382.801	14.749	.000
Intercept	3421.687	1	3421.687	131.831	.000
Decoding CVC	901.183	1	901.183	34.721	.000*
Group	235.171	2	117.585	4.530	.013*
Error	2439.770	94	25.955		
Total	23049.000	98			
Corrected Total	3588.173	97			

* Significant at the $p < .025$ level.

Table 21

Pairwise Comparisons for Decoding CVC Words

Group I	Group J	Mean Difference (I-J)	Standard Error	p
Treatment	Treatment			
	Comparison	3.473*	1.264	.022
	Control	3.050	1.254	.051
Comparison	Treatment	-3.473*	1.264	.022
	Comparison			
	Control	-.423	1.264	1.000
Control	Treatment	-3.050	1.254	.051
	Comparison	.423	1.264	1.000
	Control			

* Significant at the $p < .025$ level.

Table 22

Adjusted Group Means for Decoding CVC Posttest

Group	Mean	Standard Error	N
Treatment	16.253	.887	33
Comparison	12.780	.901	32
Control	13.203	.887	33

Table 23

Summary of ANCOVA for Decoding Nonwords

Source	Type III Sums of Squares	df	Mean Square	F	p
Corrected Model	1655.146	3	551.715	18.337	.000
Intercept	2980.246	1	2980.246	99.052	.000
Decoding Nonwords	1371.568	1	1371.568	45.586	.000
Group	416.480	1	208.240	6.921	.002*
Error	2828.242	94	30.088		
Total	16696.000	98			
Corrected Total	4483.388	97			

* Significant at the p < .025 level.

Because significant differences were indicated in the ANCOVA, follow-up pairwise comparisons were performed. In the post hoc comparisons, the treatment group significantly outperformed both the comparison and control groups (p = .003, p = .009). Posttest scores of the comparison and control groups did not reach significance. Summaries of the pairwise comparison and adjusted group means for decoding nonwords are provided in Tables 24 and 25.

Table 24

Pairwise Comparisons for Decoding Nonwords

Group I	Group J	Mean Difference (I-J)	Std. Error	p
Treatment	Treatment			
	Comparison	4.632*	1.372	.003
	Control	4.102*	1.352	.009
Comparison	Treatment	-4.632*	1.372	.003
	Comparison			
	Control	-.530	1.366	1.000
Control	Treatment	4.102*	1.352	.009
	Comparison	.530	1.366	1.000
	Control			

* Significant at the .025 level.

Table 25

Adjusted Group Means for Nonword Decoding Posttest

Group	Mean	Standard Error	N
Treatment	14.057	.958	33
Comparison	9.425	.975	32
Control	9.955	.955	33

In addition to criterion measures for decoding skills, the Word Attack subtest of the WDRB was administered at posttest. A test of significant differences was conducted using an ANOVA. Analysis revealed that groups varied significantly (p = .030). The ANOVA summary is provided in Table 26. Because the ANOVA revealed significant differences between groups, follow-up pairwise comparisons were conducted. Pairwise comparisons revealed that the

Table 26

Summary of Analysis of Variance for Word Attack

Source	Type III Sums of Squares	df	Mean Square	F	p
Corrected Model	120.234	2	60.117	3.624	.030
Intercept	3424.106	1	3424.106	206.410	.000
Group	120.234	2	60.117	3.624	.030*
Error	1575.939	95	16.589		
Total	5117.000	98			
Corrected Total	1696.173	97			

*Significant at the p < .05 level.

treatment group scored significantly higher than the control group (p = .030). No significant differences were indicated between the control and comparison groups (p = .222), or the treatment and comparison group (p = 1.0). The summary of pairwise comparisons is provided in Table 27. The adjusted group means are provided in Table 28.

Sight Word Knowledge

For sight word knowledge, an assessment of high frequency words was administered at pretest and posttest. A test of significance was conducted through an ANCOVA, with pretest as the covariate. No interaction effects were indicated in the initial analysis (F = .747, 2, 92, p = .477), thus the interaction term was removed. The assumption for equal variance across groups was also met (F = 1.079, 2, 95, p = .344). The ANCOVA without the interaction term reached significance (F = 3.451, 2, 94, p = .036) and was followed-up with pairwise comparisons. Post hoc comparisons revealed significant differences between the

Table 27

Pairwise Comparisons for WDRB Word Attack Posttest

Group I	Group J	Mean Difference (I-J)	Std. Error	p
Treatment	Treatment			
	Comparison	.811	1.010	1.000
	Control	2.636*	1.003	.030
Comparison	Treatment	-.811	1.010	1.000
	Comparison			
	Control	1.826	.222	.222
Control	Treatment	-2.636*	.030	.030
	Comparison	-1.826	.222	.222
	Control			

* Significant at the $p < .05$ level.

Table 28

Adjusted Group Means for Word Attack Posttest

Group	Mean	Standard Deviation	N
Treatment	7.0606	3.8966	33
Comparison	6.2500	5.2487	32
Control	4.4242	2.7160	33

treatment group and the control group. Though posttest scores were higher for the treatment group, differences between the treatment and comparison groups did not reach significance. The differences between comparison and control were also not significant. Summaries of the ANCOVA, adjusted posttest means, and post hoc comparisons are provided in Tables 29, 30, and 31.

Table 29

Summary of Analysis of Covariance without Interaction Term for Sight Word Knowledge

Source	Type III Sums of Squares	df	Mean Square	F	p
Corrected Model	81042.784	3	27014.261	39.836	.000
Intercept	24703.378	1	24703.378	36.428	.000
Sight words	75617.487	1	75617.487	111.507	.000
Group	4680.943	2	2340.471	3.451	.036*
Error	63745.216	94	678.141		
Total	356038.000	98			
Corrected Total	144788.000	97			

*Significant at the $p < .05$ level.

Table 30

Pairwise Comparisons for Sight Words

Group I	Group J	Mean Difference (I-J)	Std. Error	p
Treatment	Treatment			
	Comparison	11.965	6.472	.203
	Control	16.264*	6.413	.039
Comparison	Treatment	-11.965	6.472	.203
	Comparison			
	Control	4.299	6.484	1.000
Control	Treatment	-16.264*	6.413	.039
	Comparison	-4.299	6.484	1.000
	Control			

* The mean difference is significant at the $p < .05$ level.

Table 31

Adjusted Posttest Means for Sight Words

Group	Mean	Standard Error	N
Treatment	55.812	4.534	33
Comparison	43.847	4.614	32
Control	39.548	4.539	33

The word identification subtest of the WDRB was administered at posttest to provide a standard measure for sight word knowledge. The pretest of the PPVT, which measures general verbal ability and is highly correlated with reading skills, was used as a covariate. Analysis revealed no significant differences between groups at posttest (F = .559, 2, 94, p = .574). The adjusted group means are provided in Table 32.

Table 32

Adjusted Group Means for the Word Identification Subtest of the WDRB

Group	Mean	Standard Error	N
Treatment	22.813	.869	33
Comparison	21.559	.915	32
Control	21.830	.869	33

Reading Passage Fluency

A first-grade passage from the Qualitative Reading Inventory II (QRI II) was administered to assess passage reading fluency at pretest and posttest. With the pretest as a covariate, an ANCOVA was performed to test for significant differences between groups at posttest. Assumptions for linearity and equal variance were met and the ANCOVA was run without the interaction term. The summary for the ANCOVA is provided in Table 33. Although the treatment group scored higher than either the comparison or control groups, significance was not reached (F = 1.002, 2, 94, p = .371). Adjusted group means are provided in Table 34.

Table 33

Summary of Analysis of Covariance without Interaction Term for Fluency

Source	Type III Sums of Squares	df	Mean Square	F	p
Corrected Model	33067.817	3	11022.606	69.601	.000
Intercept	4826.229	1	4826.229	30.475	.000
Fluency	32767.923	1	32767.923	206.909	.000
Group	317.255	2	158.627	1.002	.371
Error	14886.683	94	158.369		
Total	114567.000	98			
Corrected Total	47954.500	97			

Table 34

Adjusted Posttest Means for Fluency

Group	Mean	Standard Error	N
Treatment	28.320	2.191	33
Comparison	25.952	2.225	32
Control	23.939	2.191	33

Reading Comprehension

The same first-grade passage from the Qualitative Reading Inventory II (QRI II) that was administered to assess passage reading fluency was used to measure passage comprehension at pretest and posttest. With the pretest as a covariate, an ANCOVA was performed to test for significant differences between groups at posttest. Assumptions for linearity and equal variance were met and the ANCOVA was run without the interaction term. The summary for the ANCOVA is provided in Table 35. Differences between groups at posttest approached significance (F = 2.741, 2, 94, p = .070). The adjusted means at posttest are provided in Table 36.

Table 35

Summary of the Analysis of Covariance for Reading Comprehension

Source	Type III Sums of Squares	df	Mean Square	F	p
Corrected Model	897.812	3	299.271	15.304	.000
Intercept	939.552	1	939.552	48.046	.000
Comprehension	837.432	1	837.432	42.824	.000
Group	107.199	2	53.600	2.741	.070
Error	1838.188	94	19.555		
Total	5624.000	98			
Corrected Total	2736.000	97			

Table 36

Adjusted Posttest Means for Reading Comprehension

Group	Mean	Standard Error	N
Treatment	6.161	2.191	33
Comparison	6.195	2.225	32
Control	3.953	2.191	33

Procedural Reliability

To ensure procedural reliability, each instructor was observed by a trained individual three times during the instructional phase of the study. Observations were conducted for the treatment lessons and the comparison lessons. For each observation, a checklist was completed that indicated whether each component of the lesson was implemented as trained and that only the treatment group received alphabetic word work with manipulative letters.

The instructors in the treatment condition were observed a total of 30 times and demonstrated 100% procedural reliability. On all observations, instructors followed the format of the lesson as described in the training manual. Each instructor used manipulative letters with the students in the treatment condition.

The instructors in the comparison condition were observed a total of 30 times and demonstrated 100% procedural reliability. On all observations, instructors followed the format of the lesson as described in the training manual. No instructor used manipulative letters with the students in the comparison condition.

Social Validity

Two types of procedural validity data were gathered: (a) intervention instructor feedback and (b) classroom teacher feedback. Subject interviews were also conducted to determine the outcome validity from the students' perspectives. The results of these surveys are reported in the following sections.

Instructor Survey Results

Instructors completed instructor surveys at the conclusion of the study to report the acceptability of the instructional procedures. In addition, the instructors provided feedback on each lesson component in terms of its importance for supporting the development of beginning readers. Results of the instructor survey are reported in Table 37.

Table 37

Results of the Intervention Instructor Survey

How important did you feel each part of the lesson is in supporting the development of good readers?				
	Not Important	Somewhat Important	Important	Very Important
Book Introduction	0	1	1	5
Coaching Through the Book	0	0	1	6
Magnetic Letter Work	0	0	1	6
Rereading the Book	0	0	3	4
How would you rate each component of the lesson in terms of its implementation?				
	Very Difficult	Difficult	Easy	Very Easy
Book Introduction	0	0	2	5
Coaching Through the Book	0	0	4	3
Magnetic Letter Work	0	1	3	3
Rereading the Book	0	0	1	6
	Strongly Disagree	Disagree	Agree	Strongly Agree
It is important to have the letters divided into the storage box.	0	0	3	4
It is important to have the letters presorted onto the magnetic boards.	0	0	1	6
Predetermined word lists made lessons easier to implement.	0	0	0	7
It is important to have letters of the same color.	0	0	2	5

Teacher Surveys

Twenty educators were asked to view a lesson video and complete a survey on the acceptability and viability of the programmed intervention. The respondents included classroom teachers, special education resource teachers, Title 1 teachers, and curriculum resource staff. The survey focused on procedural acceptability and the effectiveness of the intervention in supporting the development of good readers. The results of the survey indicated that the intervention is acceptable, with 100% of the teachers responding that it would be an appropriate intervention for use in their classroom. In addition to overall lesson acceptability, each lesson component was considered acceptable by a majority of those surveyed. In fact, only one component, coaching students through the book, received any negative responses, and the negative responses were from one group of teachers who viewed and discussed the video together. The four teachers were concerned with the instructor's limited corrections of student errors during coaching, and criticized the implementation of the component rather than the effectiveness of the practice. Most importantly, teachers who viewed the lesson responded that the use of manipulative letters supported the development of good readers and was easy to implement. Although only 11 teachers reported using a strategy similar to the manipulative letter component in their reading instruction, after viewing the video, all 20 responded that they would be likely to use manipulative letters in the future. The results of the teacher surveys are reported in Table 38.

Table 38

Results of the Teacher Surveys

Book Introduction	**Yes**	**No**
Do you feel that this part of the lesson is helpful in supporting the development of good readers?	19	0
Would you consider this component easy to implement?	18	0
In your reading instruction, do you already use a strategy similar to this component of the lesson?	17	1
Would you be likely to use a strategy like this in your reading instruction?	18	0
Coaching Students Through the Book	**Yes**	**No**
Do you feel that this part of the lesson is helpful in supporting the development of good readers?	16	4
Would you consider this component easy to implement?	19	0
In your reading instruction, do you already use a strategy similar to this component of the lesson?	11	9
Would you be likely to use a strategy like this in your reading instruction?	15	4
Word Work with Manipulative Letters	**Yes**	**No**
Do you feel that this part of the lesson is helpful in supporting the development of good readers?	20	0
Would you consider this component easy to implement?	19	0
In your reading instruction, do you already use a strategy similar to this component of the lesson?	11	9
Would you be likely to use a strategy like this in your reading instruction?	20	0
Rereading the Book	**Yes**	**No**
Do you feel that this part of the lesson is helpful in supporting the development of good readers?	17	0
Would you consider this component easy to implement?	16	1
In your reading instruction, do you already use a strategy similar to this component of the lesson?	16	2
Would you be likely to use a strategy like this in your reading instruction?	18	0
Lesson Acceptability	**Yes**	**No**
Overall, do you consider this an acceptable intervention for use in a classroom like yours?	20	0

Student Interviews

At the conclusion of the study, six students were interviewed in respect to their perceptions of the intervention with manipulative letters. The interviewer presented the manipulative letters to the students and asked a series of four questions. In addition, the student was shown one multisyllable word and one multisyllable nonword to decode. Although multisyllable words were not manipulated in the intervention, the goal of the final two questions was to determine if students could generalize the decoding skills to multisyllable words. The results of the student interview are provided in Table 39.

Summary

The purpose of this study was to determine the effects of alphabetic word work with manipulative letters in a meaningful context on the reading skills of struggling first-grade students. The reading skills assessed included phonological awareness, decoding of words and nonwords, sight word knowledge, reading fluency, and reading comprehension. In addition to student outcome measures, social validation measures were included to assess the acceptability and viability of the programmed intervention.

Results indicated that students who received instruction that included alphabetic word work with manipulative letters scored significantly higher on measures of phonological awareness, decoding, and sight word knowledge. However, the differences between groups on measures of fluency and comprehension did not reach significance. Post hoc comparisons were conducted to further investigate differences between groups. The treatment group performed significantly better than the control group on measures of

Table 39

Results of Student Interviews

Question 1: What did you think of the activities that you did with these magnetic letters? (Interviewer showed magnetic letters to student)	
Student 1	Kinda strange because they stick to the board. But they were fun to play with.
Student 2	I spelled stuff with them. I liked it.
Student 3	They were fun.
Student 4	Thought they were fun. I liked it when [the instructor] mixed them up and then asked us to make the word again.
Student 5	I thought they were great because they were good for my brain.
Student 6	They were fun—I liked putting all the letters together on the board.
Question 2: Will you use anything from those activities again?	
Student 1	Yes, if I had some letters
Student 2	Not sure.
Student 3	Yep.
Student 4	Maybe. I could use the letters to sound out words.
Student 5	Yes. I think they will be a lot of fun in second grade. . . these [letters] might be useful for new stuff in second grade.
Student 6	Yes. I would like to. Maybe in reading.
Question 3: Did the magnetic letters help you in your reading?	
Student 1	Yes, when I sound words out I can pick up the letters and sound them out in case I make a mistake.
Student 2	Yes, I spelled stuff with them and then I could sound them out.
Student 3	We read the story then worked with letters and then read the story again and we did better. We just read better.
Student 4	Yes—helped in learning new words
Student 5	Yes, the words I learned helped me.
Student 6	Yes, helped me pay attention to my reading teacher and all the letters in the words.

Table 39--continued.

Question 4: Will you use what you learned from the letters in your reading?	
Student 1	Yep, like say at the beginnings of stories I don't know what a word is I can use the letters to sound it out because sometimes I put the letters in a different place to sound it out.
Student 2	Yes.
Student 3	Yep.
Student 4	Maybe.
Student 5	Yes, they help you read.
Student 6	Yes, helped me with my sounds
Question 5: Can you show me how to use the letters to read this word? (upset)	
Student 1	{Student separated the word into up & set; then sounded out word correctly}
Student 2	You sound them out, like, {attempted to sound out letter-by-letter; prompted to split word} up-set {correctly blended after prompting}
Student 3	{Broke up word confidently; saw word up} up-set, upset
Student 4	Sound it out letter by letter, maybe touch each letter.
Student 5	I'm gonna have to stretch them—this word is different from the words I did. {points to each letter and sounds each out}
Student 6	{separates up and set, reads} "up" {sounds out set} pushes them together and reads, "upset"
Question 6: Can you show me how to use the letters to read this silly word? (tepus)	
Student 1	{Student separated the word into tep & us; then sounded out word correctly}
Student 2	You sound them out, like, {attempted to sound out letter-by-letter; prompted to split word} tep-us {correctly blended after prompting}
Student 3	{Broke up word confidently; saw word us} us, tep-us, tepus
Student 4	{Sounded nonword out letter by letter} Blended correctly
Student 5	{points to each letter} t-e-p-u-s, tepus
Student 6	{points to each letter and sounds them out, then blends them together}

phonological awareness and sight words, and better than both the comparison and control groups on decoding.

In addition to measures of reading ability, social validity data were gathered to determine the acceptability of the intervention. Teachers, students, and intervention instructors provided social validity data. The response to the intervention was overwhelmingly positive, with 100% of the teachers considering alphabetic word work with manipulative letters an acceptable intervention. Students were also enthusiastic about the intervention and several students stated that they would use the skills they learned in the study in their reading.

CHAPTER 5
DISSCUSSION

In this chapter, a discussion of the findings and implications of the effects of alphabetic word work with manipulative letters on the reading skills of first-grade students struggling to acquire skilled reading is presented. First, the hypotheses and findings of the study are summarized. Subsequently, the theoretical implications of the findings are described. Finally, limitations of the study and implications for future research are addressed.

Summary of the Hypotheses and Results

This study was conducted to answer the following research question: What effects does using manipulative letters to teach decoding in a meaningful context have on the reading skills of struggling first-grade students? The following null hypotheses were tested at the .05 level of confidence.

H_1: There will be no statistically significant difference on measures of phonological awareness between the subjects who receive manipulative alphabetic word work in a meaningful context and those who do not receive manipulative alphabetic word work in a meaningful context.

Four measures were used to assess phonological awareness skills. Each assessment was treated independently because the assessments measured skills at different levels of phonological awareness: (a) word level, (b) syllable level, (c) onset-rime level, and (d) phoneme level. Analyses revealed that significant group differences existed at the syllable level, onset-rime level, and the phoneme level, resulting in a rejection of the null hypothesis. A treatment by covariate interaction occurred at the word level, which negated the use of ANCOVA for further analyses.

H_2: There will be no statistically significant difference on measures of decoding between the subjects who receive manipulative alphabetic word work in a meaningful context and those who do not receive manipulative alphabetic word work in a meaningful context.

Initial analysis of the data revealed significant differences between groups on decoding measures at posttest, resulting in a rejection of the null hypothesis. The group who received alphabetic word work with manipulative letters scored significantly higher than the control group on decoding CVC words. The difference at posttest between the experimental group and the comparison group approached significance ($p = .051$). However, the pretest and posttest means of the comparison and control groups were identical. The lack of significant differences between comparison and treatment may have been due to larger variance in the posttest scores of the comparison group that resulted in a slight loss of power.

For decoding nonwords, the experimental group scored significantly higher than either the comparison or the control group on posttest, suggesting that the word work with manipulative letters is an effective intervention for improving the decoding skills of struggling first-grade readers. In addition, group differences on posttest on the Word Attack subtest of the WDRB reached significance. Follow-up comparison revealed that the treatment group outperformed the control group on that measure. Although the difference did not reach statistical significance, the treatment group also scored better than the comparison group on that measure. One reason for the lack of significant differences may be the fact that the test has a small number of items at the beginning reading level and therefore, given the small range, differences are difficult to detect through statistical analyses.

H_3: There will be no statistically significant difference on measures of sight word reading between the subjects who receive manipulative alphabetic word work in a meaningful context and those who do not receive manipulative alphabetic word work in a meaningful context.

Initial analysis of the data revealed significant differences between groups on sight word measures at posttest, resulting in a rejection of the null hypothesis. Follow-up analyses revealed that the performance of the experimental group was better than that of the control group. Mean differences at posttest for the experimental and the comparison groups did not reach significance. The lack of significant differences between these two groups may have been a result of the instruction in the comparison condition. Both the treatment and experimental groups received instruction that included rereading of meaningful connected text. It has been established in the reading research that rereading is an effective strategy to increase sight vocabulary (LaBerge & Samuels, 1974). However, the treatment group still scored higher than the comparison group in sight word reading. The adjusted group mean for the treatment group was 55.812, the comparison group was 43.847, and the control group was 39.458. Although the mean difference did not reach statistical significance, the addition of the manipulative letters may have resulted in the higher sight word reading scores.

H_4: There will be no statistically significant difference on measures of passage reading fluency between the subjects who receive manipulative alphabetic word work in a meaningful context and those who do not receive manipulative alphabetic word work in a meaningful context.

No significant difference was indicated between the experimental, comparison, and control groups on measures of passage reading fluency. Thus, the null hypothesis was not rejected.

H_5: There will be no statistically significant difference on measures of reading comprehension between the subjects who receive manipulative alphabetic word work in a meaningful context and those who do not receive manipulative alphabetic word work in a meaningful context.

No significant difference was indicated between the experimental, comparison, and control groups on measures of passage reading fluency. The lack of significant differences resulted in a failure to reject the null hypothesis.

Theoretical Implications of the Research Findings

This study was based on two interrelated theories of reading: Adams's model of the reading process and Ehri's phases of word recognition ability. Adams's connectionist model of the reading process, a parallel distributed processing (PDP) model, provides an understanding of skilled reading and the connections that must be developed for the reading system to function. In a PDP model, knowledge is acquired through the strengthening of connections between processing units (Bereiter, 1991; McClelland, 1986). In Ehri's theory of the development of word recognition ability, beginning readers progress through a series of phases: (a) prealphabetic phase, (b) partial alphabetic phase, (c) full alphabetic phase, and (d) consolidated alphabetic phase (Ehri, 1991, 1992, 1999). This study connected these two theories by suggesting that progression to each new phase of word recognition ability is dependent upon the strengthening of associations between processing units.

The intervention in this study was developed to strengthen the connectivity between processing units so that the beginning reader could progress through the phases of word reading ability described by Ehri (1987, 1991, 1999). The intervention for the experimental group and the comparison group included instructional components and methods supported by empirical research: (a) explicit instruction, (b) combined instruction in phonological awareness and letter-sound correspondence, and (c) instruction in a meaningful context. Only the treatment group received a multisensory component, alphabetic word work with manipulative letters. The intent of the use of manipulative letters was to make the abstract concept of phoneme-grapheme relationships concrete, strengthening the circular connectivity between the orthographic, phonological, and meaning processors.

The use of manipulative materials in reading instruction has been recommended by numerous researchers and education professionals (Juel & Minden-Cupp, 2000; Montessori, 1912; Orton, 1937; Pinnell & Fountas, 1998) and has been incorporated into several successful reading interventions (e.g., Bradley & Bryant, 1983; Fielding-Barnsley, 1997; Haskell et al., 1992), but their effectiveness has not been empirically validated. This study isolated alphabetic word work with manipulative letters as an independent variable to determine the effects of their use on various reading skills of first-grade students struggling in learning to read.

The results of the statistical analyses validated the hypothesis that the use of manipulative materials in reading is effective in strengthening connections between the orthographic, phonological, and meaning processors, thus allowing the progression through the phases of word recognition ability. At the onset of this study, the participants were not able to use grapheme-phoneme information at the full alphabetic phase, evidenced by their inability to decode nonwords. As a group, however, treatment participants who received instruction with manipulative letters significantly outperformed students in either the control or comparison group on the decoding nonwords measure. Because the only difference between the comparison and treatment instruction was the addition of manipulative letters, a functional relationship can be established between manipulative letter instruction and the ability to decode nonwords. This relationship is particularly important because the primary difficulty of individuals with reading disability is the lack of skill in word recognition ability (Torgesen et al., 1997).

Previous research has suggested that repeated exposure to print increases sight word knowledge (Adams, 1990; LaBerge & Samuels, 1974; National Reading Panel, 2000; Snow et al., 1998). This study supports the effectiveness of rereading text for improving the ability to recognize words automatically and effortlessly. The intervention for the treatment and comparison participants included rereading text. Both the treatment group and the comparison group performed better on the assessment of high frequency sight word knowledge than the control group. However, the mean difference at posttest was significant only between the treatment group and the control group. The rereading of the text did improve the sight word knowledge of the comparison group; however, greater gains were made with the group that received multisensory instruction with manipulative letters. This finding suggests that the use of manipulative letters strengthens connections between the processors, making the access of words in lexical memory more efficient.

Limitations to the Present Study

This study had several limitations. Because the study was conducted with first-grade participants only, the results cannot be generalized to older or younger students. Although early intervention is important in the prevention of reading disability (Lyon, 1999; Snow, Burns, & Griffin, 1998; Torgesen et al., 1997), the need also exists for effective interventions for older students with reading difficulties. However, these study results cannot be generalized to that population.

A second limitation of the study was the small-group instruction ($n = 3$) that occurred outside the regular classroom. The results of the study may have been different if the instruction had taken place within the classroom setting. Furthermore, the results of this study are limited to small-group implementation. Though using manipulative letters may be an effective strategy for large group instruction, the results of this study cannot be generalized to anything other than small-group instruction.

Implications for Future Research

The results and limitations of this study provide implications for future research. The incorporation of alphabetic word work with manipulative letters implemented in small groups in this study was validated as an effective strategy for developing word reading skills for struggling first-grade students. A follow-up study conducted with alphabetic word work with manipulative letters implemented in large-group settings is warranted.

According to the recent education statistics, many children are failing to reach reading proficiency. On the 1998 National Assessment of Educational Progress, 69% of students in fourth grade failed to reach grade level reading proficiency. Clearly, effective reading interventions for older students are justified. Implementation of this strategy with older students experiencing reading difficulty is a logical next step of this research.

The long-term effects of alphabetic word work with manipulative letters are also of interest. The participants in this study were selected based on poor performance on a screening measure of phonological awareness and the alphabetic principle, identifying them as at-risk for reading disability. A long-term follow-up study to determine the percentage of students later identified as reading disabled may suggest whether this early intervention is successful in preventing reading failure. Further, research suggests that decoding skills in first grade are highly correlated to comprehension skills in ninth grade (Juel, 1988). Although the mean differences at posttest on comprehension measures were not significant at this time, the acquisition of efficient decoding skills may prepare them for developing improved comprehension skills.

Summary

This study was conducted to examine the effects of alphabetic word work with manipulative letters on the reading skills of struggling first-grade students. Results indicated that the treatment group significantly outperformed the control group on measures of phonological awareness, decoding, and sight word knowledge, and they performed significantly better than the comparison group on measures of decoding. Though some mean differences were not statistically significant, the treatment group outperformed the comparison group and the control group on all dependent measures.

The findings of this research hold important implications for reading instruction. The goal of reading instruction is to help students acquire skilled reading as described in Adams's model of the reading process. In skilled reading, all four processors work simultaneously. If any one processor does not function, the system breaks down. The results of this study support the hypothesis that multisensory instruction strengthens the connections between processing units, helping the struggling reader develop the necessary connectivity that allows efficient functioning of the system.

A benefit of this intervention is that it focuses on two of the skills related to core deficits of reading disability. A majority of students with reading disability experience difficulty in phonological awareness, and many have deficits in orthographic processing. Instruction with manipulative letters may improve skills in deficit areas and help to prevent reading failure.

Finally, classroom teachers, intervention instructors, and participants socially validated this intervention. The outcomes of an intervention are unimportant if the procedures are unacceptable to instructors or participants. Not only were the student outcomes positive, but also teachers and students were enthusiastic about the intervention. Alphabetic word work with manipulative letters offers a promising intervention for developing successful readers.

APPENDIX A

PARENTAL INFORMED CONSENT

PARENTAL INFORMED CONSENT DOCUMENT

Dear Parent/Guardian,

I am a doctoral student in the Department of Special Education at the University of Florida. One of my areas of interest is the development of instructional methods in beginning reading. I will be implementing an intervention project that evaluates the use of magnetic letters in beginning reading instruction. Participation in this study may directly help your child in the development of the abilities necessary to become a skilled reader.

In this project, we will conduct informal assessments that indicate your child's current reading abilities. Students in the decoding group will participate in small group instruction that includes working with magnetic letters to form words. Students in the comparison group will work on reading skills that are not directly related to decoding. Students in the control group will not receive supplemental instruction. The sessions will be scheduled during the students' regular reading time and will not interfere with other regular instruction. Although results of the project will be shared with colleagues in the field of education (e.g., participants at educational conferences, university faculty), for the purpose of confidentiality, your child's name and identity will be kept confidential.

Participation or nonparticipation in this project will not affect your child's placement in any programs. You and your child have the right to withdraw consent for participation at any time without consequence. There are no known risks or compensation for his/her participation in this project. The project will last this entire school year. Results of the project will be available upon completion of the school year. If you have any questions about this project, please contact me at (352) 392-0701. Questions or concerns about research participants' rights may be directed to the UFIRB office, University of Florida, Box 112250, Gainesville, FL 32611 (352) 392-0433).

Sincerely,

Paige C. Pullen, M.Ed.

I have read the procedures described above. I voluntarily give my consent for my child,

________________________________, to participate in Mrs. Pullen's reading study. I have received a copy of this description.

________________________________ Parent/Guardian	______________________ Date
________________________________ 2nd Parent/Witness	______________________ Date

APPENDIX B

SCREENING INSTRUMENT:
TEST OF INVENTED SPELLING

SCREENING INSTRUMENT--INVENTED SPELLING TEST

Directions: Administer the following list as a "pretend" spelling. Let student know that the purpose of this test is to see how well they can sound out words. The examiner may begin by saying, "I know you haven't learned to spell these words yet, but I want to you to sound them out and try the best you can." Encourage the student to attempt every word and to write as much as he knows about each word. To administer the test, say each word then read the sentence and, finally, repeat the word. Allow the student sufficient time to sound out each word carefully. Speed is not a factor in this test, and it is not necessary to administer all items in one sitting. Do NOT sound out words *for* the student. Spellings will be scored for phonological accuracy. If students already know the conventional spelling of a word, substitute another word with similar phonological features, and make a notation on the test.

1. pretend	We can pretend we are old.	pretend
2. float	The canoe will float down the river.	float
3. while	Whistle while you work.	while
4. ruler	We used a ruler to measure the paper.	ruler
5. finish	Derek helped me finish my work.	finish
6. angry	Mother was angry when we were late.	angry
7. picking	The children were picking flowers.	picking
8. junk	I cleaned the junk out of my closet.	junk
9. planted	We planted a tree in the yard.	planted
10. dress	Annie wore a blue dress.	dress

Directions for Scoring: This assessment is scored based on phonological accuracy of each spelling. Points are awarded based on the scale below.

1/2 point	1 phoneme other than the initial phoneme accurately represented
1 point	initial phoneme accurately represented
2 points	initial phoneme and one other phoneme accurately represented
3 points	initial phoneme and two or more other phonemes accurately represented
4 points	phonologically accurate spelling

APPENDIX C

PHONOLOGICAL AWARENESS ASSESSMENT

Jump Start in Reading

PHONOLOGICAL AWARENESS ASSESSMENT

Word Level

Tapping Words

DIRECTIONS: Begin by modeling the procedure. First, say "A frog is green." Then model tapping the table for each word in the sentence. Ask the child to try to say the sentence and tap for each word. Model again using the practice item sentence. Ask the child to say and tap the second sentence.

PRACTICE ITEM:

"The little frog is jumping."		PRE	POST
TEST ITEMS:	ANSWER	(+/-)	(+/-)
1. Sue is my friend.	4 TAPS	____	____
2. My mother is calling me.	5 TAPS	____	____
3. The dog is chasing the kittens.	6 TAPS	____	____
4. The boy is running.	4 TAPS	____	____
5. She is wearing a purple jacket.	6 TAPS	____	____
	Tapping Words Score	____/5	____/5

Deleting Words

PRACTICE ITEM:	ANSWER		
Say COWBOY. Now say COWBOY without saying BOY.	COW	PRE	POST
TEST ITEMS:		(+/-)	(+/-)
1. SAILBOAT	BOAT	____	____
2. APPLESAUCE	APPLE	____	____
3. SIDEWALK	WALK	____	____
4. SUNSHINE	SHINE	____	____
5. CUPCAKE	CUP	____	____
	Deleting Words Score	____/5	____/5

Syllable Level

Blending Syllables

PRACTICE ITEM: I'm going to say a word one part at a time. I want you to listen carefully, then put the parts together to make a whole word. Ready? Let's try one. What word do these sounds make? 'can-dy' candy

		PRE	POST
TEST ITEMS:	ANSWER	(+/-)	(+/-)
1. tea-cher	teacher	____	____
2. hopp-ing	hopping	____	____
3. va-ca-tion	vacation	____	____
4. mo-tor-cy-cle	motorcycle	____	____
5. re-frig-er-a-tor	refrigerator	____	____
	Blending Syllables Score	___/5	___/5

Tapping Syllables

PRACTICE ITEM: COMPUTER

		PRE	POST
TEST ITEMS:	ANSWER	(+/-)	(+/-)
1. ALLIGATOR	4 TAPS	____	____
2. JUMP	1 TAP	____	____
3. VISIT	2 TAPS	____	____
4. DINOSAUR	3 TAPS	____	____
5. BASKET	2 TAPS	____	____
	Tapping Syllables Score	___/5	___/5

Deleting Syllables

PRACTICE ITEM: Say WONDER. Now say WONDER without saying DER.	(WON)	PRE	POST
TEST ITEMS:	ANSWER	(+/-)	(+/-)
1. Say SANDWICH. Now say SANDWICH without saying SAND.	(WICH)	____	____
2. Say SAILOR. Now say SAILOR without saying LOR.	(SAY)	____	____
3. Say PROGRAM. Now say PROGRAM without saying GRAM.	(PRO)	____	____
4. Say ANSWERING. Now say ANSWERING without saying ING.	(ANSWER)	____	____
5. Say ADVENTURE. Now say ADVENTURE without saying AD.	(VENTURE)	____	____
	Deleting Syllables Score	___/5	___/5

Onset/Rime Level

Matching Rhymes

	ANSWER	PRE +/-	POST +/-
PRACTICE ITEM:			
Do these two words rhyme? SACK/BLACK	yes		
Do these two words rhyme? BEAT/BEAN	no		
TEST ITEMS:			
1. Do these two words rhyme? HILL/STILL	yes	____	____
2. Do these two words rhyme? DRIP/DROP	no	____	____
3. Do these two words rhyme? JUMP/BUMP	yes	____	____
4. Do these two words rhyme? DOCK/ROCK	yes	____	____
5. Do these two words rhyme? DAY/CAKE	no	____	____
Matching Rhymes Score		____/5	____/5

Blending Onsets and Rimes

	ANSWER	PRE +/-	POST +/-
PRACTICE ITEM:			
What word do these sounds make? n-ote	note		
TEST ITEMS:			
1. f-an	fan	____	____
2. s-ip	sip	____	____
3. c-at	cat	____	____
4. st-op	stop	____	____
5. d-ance	dance	____	____
Blending Onsets and Rimes Score		____/5	____/5

Generating Rhymes

	PRE +/-	POST +/-
PRACTICE ITEM:		
Tell me a word that rhymes with SAT.		
TEST ITEMS:		
1. Tell me a word that rhymes with MOP.	____	____
2. Tell me a word that rhymes with RUN.	____	____
3. Tell me a word that rhymes with NAME.	____	____
4. Tell me a word that rhymes with TIP.	____	____
5. Tell me a word that rhymes with SELL.	____	____
Generating Rhymes Score	____/5	____/5

Phoneme Level

Blending Phonemes

NOTE:	Segment sounds as indicated by a (-) in each item. Be sure to pause briefly but discernibly between segmented sounds. If the child asks you to repeat the sounds, you may do so.
PROMPT:	If the child says the sounds separately (e.g., m-e, rather than me) prompt by saying, Try to say the sounds altogether as a real word. This prompt may be used as often as needed on practice items only.
DIRECTIONS FOR PRACTICE ITEMS:	I'm going to say a word in small parts. I will say one part of the word at a time. I want you to listen carefully, then put the parts together to make a whole word. Ready? Let's try one. What word do these sounds make? 'l-i-p'
If correct:	That's right. Let's try the next one.
If incorrect:	That's not quite right. When you put 'l-i-p' together, it makes 'lip'. Let's try the next one.

PRACTICE ITEMS (continue to give corrective feedback as above):	Correct response:
What word do these sounds make? i-t	it
What word do these sounds make? m-a-p	map

DIRECTIONS FOR TEST ITEMS:	Let's try some more words. Each time, I will say a word one part at a time. Listen carefully and put the parts together to make a whole word.

TEST ITEMS (provide no more feedback)	Correct response:	PRE (+/-)	POST (+/-)
1. n-o	no		
2. i-f	if		
3. sh-e	she		
4. s-u-n	sun		
5. c-a-p	cap		
6. b-o-th	both		
7. f-a-s-t	fast		
8. j-u-m-p	jump		
9. s-t-ar-t	start		
10. s-p-l-a-sh	splash		
	Blending Phonemes Score	__/10	__/10

Segmenting Phonemes

CEILING:	Stop when child misses 5 items in a row.
DIRECTIONS:	I am going to say a word. I want you to break the word apart and say it sound by sound. Say each sound you hear in the order that you hear it. For example, if I say DAY, you would say it sound by sound, D-AY. Now you say the word DAY sound by sound.
If correct:	That's right. You have the idea. Let's try the next one.
If incorrect:	That's not quite right. To say DAY sound by sound, say D-AY. Let's try the next one.

PRACTICE ITEMS (continue corrective feedback)

Remember, I will say a word, then you say it sound by sound.

	Correct response:
a. no	n-o
b. it	i-t
c. pie	p-ie

Let's try a few more. I will say a word, then you say it sound by sound.

TEST ITEMS (no feedback)		PRE (+/-)	POST (+/-)
1. go	g-o	________	________
2. up	u-p	________	________
3. me	m-e	________	________

Now we are going to do some words that have more sounds in them. Let's try a few for practice. (give corrective feedback as on previous practice items)

PRACTICE ITEMS

a. mat	m-a-t
b. good	g-oo-d
c. winner	w-i-nn-er

TEST ITEMS CONTINUED (no feedback)		PRE (+/-)	POST (+/-)
4. back	b-a-k	________	________
5. mop	m-o-p	________	________
6. pig	p-i-g	________	________
7. stop	s-t-o-p	________	________
8. smoke	s-m-o-ke	________	________
9. toast	t-oa-s-t	________	________
10. mother	m-o-th-er	________	________
	Segmenting Phonemes Score	____/10	____/10

ASSESSMENT D

DECODING ASSESSMENTS

Jump Start in Reading

Decoding Assessment

Directions: Begin by arranging the cards in the order listed on this assessment. Show the student the word card and provide time to decode the word or non-word. Record a plus sign or minus sign to indicate the student's performance. The purpose of this assessment is to determine if the student is able to decode simple consonant-vowel-consonant combinations.

CVC words	Pre + / -	Post + / -
sun		
fan		
hot		
rub		
mad		
map		
set		
mud		
sit		
sip		
had		
pet		
lip		
hip		
cap		
bat		
cop		
fin		
mop		
cup		
CVC Total	/20	/20

Non-words	Pre + / -	Post + / -
rop		
vot		
san		
fis		
hif		
rab		
fom		
sut		
lep		
gud		
nib		
saz		
taf		
bot		
fet		
hap		
jop		
sug		
mon		
wud		
NonwordTotal	/20	/20

APPENDIX E

SIGHT WORD ASSESSMENTS

Jump Start in Reading

Beginning Reading Assessment

Pretest Date: ________________ Post Test Date: ________________

Sight Words

Directions: Begin by arranging the cards in the order listed on this assessment. Show the student the word card quickly. Record a plus sign or minus sign to indicate the student's performance. The purpose of this assessment is to determine if the student knows the word by sight. Do not show the card for long enough for the student to decode the word.

Pre-Primer

	Pre + / -	Post + / -
run		
big		
to		
look		
we		
three		
me		
a		
can		
down		
and		
help		
my		
away		
for		
it		
one		
in		
said		
here		
Subtotal	/20	/20

	Pre + / -	Post + / -
little		
where		
go		
not		
red		
funny		
is		
make		
the		
I		
blue		
find		
come		
you		
up		
two		
yellow		
play		
jump		
see		
Subtotal	/20	/20

Primer

	Pre + / -	Post + / -
pretty		
am		
new		
well		
but		
saw		
at		
do		
must		
they		
have		
want		
our		
say		
are		
he		
soon		
went		
on		
good		
Subtotal	/20	/20

	Pre + / -	Post + / -
into		
now		
be		
this		
did		
who		
came		
cut		
with		
all		
that		
under		
too		
she		
there		
was		
get		
like		
what		
will		
Subtotal	/20	/20

First Grade

	Pre + / -	Post + / -
them		
open		
his		
when		
old		
any		
stop		
had		
let		
him		
think		
fly		
just		
some		
an		
has		
her		
ask		
may		
going		
Subtotal	/20	/20

	Pre + / -	Post + / -
put		
of		
give		
from		
were		
take		
over		
once		
after		
could		
by		
live		
then		
every		
walk		
know		
how		
again		
as		
thank		
Subtotal	/20	/20

APPENDIX F

LETTER-SOUND SEQUENCING ASSESSMENT

Jump Start in Reading

Letter-Sound Sequencing Assessment

Administration Instructions

Present each letter to the child one at a time, providing the letter sound for each letter. Then ask the child to use whatever letters are needed to make each word on the list.

Required Letters

a, e, o, p, s, t

Word	Attempt	+/-	Word	Attempt	+/-
at					
tap					
pat					
pot					
top					
tops					
stop					
step					
pet					
pets					

APPENDIX G

INSTRUCTOR SURVEY

Instructor Survey

Just as your participation in the first grade intervention study has been critical to the success of the project, your feedback is important to the future success of the intervention and further investigations. Please complete the following survey. Your suggestions will help in modifying the intervention and study procedures. Again, your contributions to the study have been invaluable.

I ______________________________ give permission for my responses on the following survey to be used in dissemination materials. I understand that my name will not be used in any publication or dissemination materials.

______________________________ ____________________

Signature Date

How important did you feel each part of the lesson is in supporting the development of good readers?

Book Introduction	Not Important	Somewhat Important	Important	Very Important
Coaching Through the Book	Not Important	Somewhat Important	Important	Very Important
Magnetic Letter Work	Not Important	Somewhat Important	Important	Very Important
Rereading the Book	Not Important	Somewhat Important	Important	Very Important

How would you rate each component of the lesson in terms of its implementation?

Book Introduction	Very Difficult	Difficult	Easy	Very Easy
Coaching Through the Book	Very Difficult	Difficult	Easy	Very Easy
Magnetic Letter Work	Very Difficult	Difficult	Easy	Very Easy
Rereading the Book	Very Difficult	Difficult	Easy	Very Easy

In the section below, please consider the lesson procedures and study implementation. Circle the response that best describes your feeling about the program.

It is important to have the letters divided into the storage box.	Strongly Disagree	Disagree	Agree	Strongly Agree
It is important to have the letters presorted onto the magnetic boards.	Strongly Disagree	Disagree	Agree	Strongly Agree
Predetermined word lists made lessons easier to implement.	Strongly Disagree	Disagree	Agree	Strongly Agree
It is important to have letters of the same color.	Strongly Disagree	Disagree	Agree	Strongly Agree
The personnel at the school were helpful scheduling and facilitating lesson implementation	Strongly Disagree	Disagree	Agree	Strongly Agree
The personnel at the school were helpful scheduling and facilitating assessment administration	Strongly Disagree	Disagree	Agree	Strongly Agree
My participation in this project should prove to be beneficial to me in my profession.	Strongly Disagree	Disagree	Agree	Strongly Agree

1. Describe any modifications to the lesson that would be helpful in supporting the needs of the learner.

2. Describe any modifications to the lesson that would be helpful in supporting the needs of the instructor.

3. Describe what you learned about teaching reading.

4. How will you apply this knowledge in your classroom?

5. Describe what you learned about conducting research.

6. How will you apply this knowledge in your classroom?

APPENDIX H

CLASSROOM TEACHER SURVEY

Teacher Survey

Thank you for agreeing to evaluate the intervention in magnetic word work. Your opinions and expertise are essential to improving the lessons and procedures. All of your responses will remain anonymous. Please feel free to call or send an e-mail if you have any questions.

Paige Pullen
392-0701
374-8427
pullenpc@ufl.edu

I give permission for my responses on the following survey to be used in dissemination materials. I understand that my name will not be used in any publication or dissemination materials.

Signature: ______________________ Date: ____________

Job Description/Setting	Title I Resource	ESE Resource	Classroom Teacher	ESE Inclusion	Administrator
Students in my classroom participated in the study.			Yes		No

As you watch the videotape, please respond to the following questions about each lesson component. Feel free to provide any additional comments or responses on the back of this form (indicate question #). Thank you again for your time.

Book Introduction

1. Do you feel that this part of the lesson is helpful in supporting the development of good readers? Yes No

Why or why not?

2. Would you consider this component easy to implement? Yes No

3. In your reading instruction, do you already use a strategy similar to this component of the lesson? Yes No

4. Would you be likely to use a strategy like this in your reading instruction? Yes No

Please explain your answer.

Coaching students through the book

5. Do you feel that this part of the lesson is helpful in supporting the development of good readers? Yes No

Why or why not?

6. Would you consider this component easy to implement? Yes No

7. In your reading instruction, do you already use a strategy similar to this component of the lesson? Yes No

8. Would you be likely to use a strategy like this in your reading instruction? Yes No

Please explain your answer.

Magnetic Word Work

9. Do you feel that this part of the lesson is helpful in supporting the development of good readers? Yes No

Why or why not?

10. Would you consider this component easy to implement? Yes No

11. In your reading instruction, do you already use a strategy similar to this component of the lesson? Yes No

12. Would you be likely to use a strategy like this in your reading instruction? Yes No

Please explain your answer.

Rereading the book

13. Do you feel that this part of the lesson is helpful in supporting the development of good readers? Yes No

Why or why not?

14. Would you consider this component easy to implement? Yes No

15. In your reading instruction, do you already use a strategy similar to this component of the lesson? Yes No

16. Would you be likely to use a strategy like this in your reading instruction? Yes No

Please explain your answer.

17. Overall, do you consider this an acceptable intervention for use in a classroom like yours? Yes No

Please explain your response.

APPENDIX I

PARTICIPANT INTERVIEW

Participant Interview

1. What did you think of the activities that you did with these magnetic letters?

2. Will you use anything from those activities again?

3. Did the magnetic letters help you in your reading?

4. Will you use what you learned from the letters in your reading?

5. Can you show me how to use the letters to read this word? upset

6. Can you show me how to use the letters to read this silly word? tepus

APPENDIX J

INTERVENTION LESSONS

Little Things—1

Rigby (PM Story Starters)

Step 1: Introduce the book.

Pictures: truck, ambulance, fire *engine*, bus, crane, plane, boat
Vocabulary: little, my

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words

- For the first decodable word, point out the word in the book.
- Help the students find the necessary letters for the word.
- Guide students in forming each word on the list.
- Repeat steps for second decodable word.

Sight word

- For the sight word, help the students form the word with their letters and talk about the way the word looks.
- Have students scramble the letters and reassemble the word. Repeat this procedure.
- Help students form additional words.

Required letters

a b c d f g h i

k l m o r s t y

Decodable word 1: my		**Decodable word 2: boat**	**Sight word: is**
my	fly	boat	is
by	sky	coat	his
fry	try	goat	
sty	dry	moat	
		float	

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Me—1

Rigby (PM Story Starters)

Step 1: Introduce the book.

Vocabulary: drinking, eating, talking, laughing, talking, listening, yawning, sleeping

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a b c e g h i j k

l m n p r s t w y

Decodable word 1: am		**Decodable word 2: me**	**Sight word: talking**
am	sam	me	talking
ham	yam	he	talk
jam	clam	she	walk
pam	cram	be	walking
ram	sham		

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Playing—1

Rigby (PM Story Starters)

Step 1: Introduce the book.

Vocabulary: box, car, tent, sandbox, playhouse, tree, bathtub, bed

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.
Required letters **b d e f h i l** **m n o p s t w x**	

Decodable word 1: in		Decodable word 2: box	Sight word: the
in fin sin bin	pin tin win wind	box fox lox *mox* pox	the

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Ben's Red Car—2

Rigby (PM Story Starters)

Step 1: Introduce the book.

Pictures: Point out the parts of the red car in illustrations.
Vocabulary: wheels, tires, doors, handles, windows, windshield wipers, steering wheel, lights, roof rack, bag trailer, boat

The concepts related to the car may be difficult for this level. The introduction needs to be particularly strong to provide the necessary support for the language of the book.

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

<table>
<tr><td><i>Decodable words</i>
• For the first decodable word, point out the word in the book.
• Help the students find the necessary letters for the word.
• Guide students in forming each word on the list.
• Repeat steps for second decodable word.</td><td><i>Sight word</i>
• For the sight word, help the students form the word with their letters and talk about the way the word looks.
• Have students scramble the letters and reassemble the word. Repeat this procedure.
• Help students form additional words.</td></tr>
<tr><td colspan="2"><i>Required letters</i>
a b f g g h i i j
l n p r s t w z z</td></tr>
</table>

<table>
<tr><th colspan="2">Decodable word 1: it</th><th colspan="2">Decodable word 2: bag</th><th>Sight word: with</th></tr>
<tr><td>it</td><td>fit</td><td>bag</td><td>rag</td><td rowspan="6">with</td></tr>
<tr><td>sit</td><td>pit</td><td>gag</td><td>sag</td></tr>
<tr><td>lit</td><td>wit</td><td>hag</td><td>tag</td></tr>
<tr><td>nit</td><td><i>zit</i></td><td>jag</td><td>wag</td></tr>
<tr><td>bit</td><td><i>zig</i></td><td>lag</td><td>zag</td></tr>
<tr><td></td><td></td><td>nag</td><td>zigzag</td></tr>
</table>

Step 4: Help students reread the book.

The Go-Carts—2

Rigby (PM Story Starters)

Step 1: Introduce the book.

Pictures: predict what car comes next, color words
Vocabulary: here, comes, go-cart, winner

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

<table>
<tr><td colspan="11">Decodable words
• For the first decodable word, point out the word in the book.
• Help the students find the necessary letters for the word.
• Guide students in forming each word on the list.
• Repeat steps for second decodable word.</td><td colspan="11">Sight word
• For the sight word, help the students form the word with their letters and talk about the way the word looks.
• Have students scramble the letters and reassemble the word. Repeat this procedure.
• Help students form additional words.</td></tr>
<tr><td colspan="22">Required letters</td></tr>
<tr><td colspan="2">a</td><td colspan="2">b</td><td colspan="2">c</td><td colspan="2">d</td><td colspan="2">e</td><td colspan="2">e</td><td colspan="2">f</td><td colspan="2">g</td><td colspan="2">h</td><td colspan="2">i</td><td colspan="2">j</td></tr>
<tr><td colspan="2">k</td><td colspan="2">m</td><td colspan="2">n</td><td colspan="2">o</td><td colspan="2">p</td><td colspan="2">r</td><td colspan="2">s</td><td colspan="2">s</td><td colspan="2">t</td><td colspan="2">t</td><td colspan="2">y</td></tr>
</table>

<table>
<tr><th>Decodable word 1: go</th><th colspan="2">Decodable word 2: cart</th><th>Sight word: here</th></tr>
<tr><td>go
so
no
pro
mo
yo</td><td>cart
mart
dart
chart
car
bar
far</td><td>jar
mar
par
tar
tart
start
starts</td><td>here</td></tr>
</table>

Step 4: Help students reread the book.

Time for Dinner—2

Rigby (PM Story Starters)

Step 1: Introduce the book.

Pictures: Point out each animal and talk about the sound that animal makes.
Vocabulary: Here we come!

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.
Required letters **a b d e f g h i** **l m n o r s t w**	

Decodable word 1: time		**Decodable word 2: we**	**Sight word: for**
time	tame	we	for
dime	game	me	
lime	name	be	
lame	same	she	
fame	shame		

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

The Lazy Pig—3

Rigby PM Story Books

Step 1: Introduce the book.

Pictures: Rooster wakes up the animals on the farm; All of the animals are up; The pig is lazy. He is still asleep.
Vocabulary: wake up; farmer; cock-a-doodle-doo; lazy; asleep

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a	**b**	**c**	**d**	**f**	**g**	**h**	**i**
j	**m**	**p**	**p**	**r**	**s**	**u**	**w**

Decodable word 1: pig		**Decodable word 2: up**	**Sight word: said**
pig fig jig rig	dig big wig *mig*	up cup *hup* pup *sup*	said

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

The Merry-go-round—3

Rigby (PM Story Book)

Step 1: Introduce the book.

Pictures: Introduce characters (Nick, Kate, & Jane); How is this Merry-go-round different from ones you've seen?; point out animals on Merry-go-round
Vocabulary: pig, duck, car, plane, horse

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a b c d e f g i j l

m o p r s s t t w z

Decodable word 1: car		**Decodable word 2: pig**		**Sight word: come**
car	cart	rig	wig	come
far	mart	dig	big	comes
bar	part	fig	*blig*	come
tar	stars	lig	*flig*	some
jar	start	*zig*	flip	
star	smart			

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Tiger, Tiger—3

Rigby PM Story Book

Step 1: Introduce the book.

Vocabulary: mother monkey, baby monkey, asleep, wakes, hungry, safe

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

<table>
<tr><td>Decodable words
• For the first decodable word, point out the word in the book.
• Help the students find the necessary letters for the word.
• Guide students in forming each word on the list.
• Repeat steps for second decodable word.</td><td>Sight word
• For the sight word, help the students form the word with their letters and talk about the way the word looks.
• Have students scramble the letters and reassemble the word. Repeat this procedure.
• Help students form additional words.</td></tr>
<tr><td colspan="2">Required Letters
b c d e e f g h
l m p p r s t u v</td></tr>
</table>

Decodable word 1: tree		**Decodable word 2: up**		**Sight word: here**
tree	dee	up	*mup*	here
see	bee	sup	*tup*	
fee	tee	pup	*vup*	
lee	three	cup	*flup*	
gee	*vee*			

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Hot Dogs—4

Rigby PM Story Books

Step 1: Introduce the book.

Pictures and vocabulary: Mom is asleep but Tom is hungry; Tom and Dad look for the hot dogs; Where are the hot dogs?; Tom give dad the matches; Dad says Thank you; Tom and Dad look at the fire; Tom is going to cook a hot dog on the fire; Dad cooks a hot dog for mom.

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.
Required Letters c d f g h j l m m n o p s r t t u v y	

Decodable word 1: Tom	Decodable word 2: hot		Sight word: hungry
tom	hot	not	hungry
mom	cot	pot	
rom	dot	rot	
vom	got	tot	
lom	jot	shot	
fom	lot	*vot*	

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Sally and the Daisy—4

Rigby PM Story Books

Step 1: Introduce the book.

Pictures: The closed daisy is asleep; introduce Sally; introduce Mom
Vocabulary: daisy, asleep, thank you

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.
Required letters **a b c d f l m n n** **o p r s u v w y z**	

Decodable word 1: can		**Decodable word 2: sun**		**Sight word: down**
can	dan	sun	*zun*	down
man	fan	fun	*vun*	brown
pan	*san*	run	*lun*	brow
ban	sun	pun	funny	owl*
		bun	sunny	

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

The Baby Owls—4

Rigby PM Story Book

Step 1: Introduce the book.

Pictures: The animals on the farm are asleep. The owls in the tree are not asleep. Mother owl is looking for food for the babies.
Vocabulary: down, farm, asleep, cows, pigs, dogs, hungry, mother, moths, hoot

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a	**b**	**c**	**d**	**e**	**e**	**f**	**g**	**j**	**k**
l	**m**	**o**	**p**	**p**	**r**	**s**	**t**	**v**	**z**

Decodable word 1: tree		**Decodable word 2: asleep**		**Sight word: comes**
tree* tee bee dee fee gee	lee see seep sleep asleep*	asleep* sleep seep keep beep	deep jeep peep *veep* *zeep*	comes* come

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

A Home for Little Teddy—5

Rigby (PM Story Book)

Step 1: Introduce the book.

Pictures: Teddy does not want to sleep on the shelf. Where can Teddy sleep? He wants a new home. Teddy goes looking for a new home.
Vocabulary: mouse; mice; away; went; rabbit; little dolls; thank you

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words

- For the first decodable word, point out the word in the book.
- Help the students find the necessary letters for the word.
- Guide students in forming each word on the list.
- Repeat steps for second decodable word.

Sight word

- For the sight word, help the students form the word with their letters and talk about the way the word looks.
- Have students scramble the letters and reassemble the word. Repeat this procedure.
- Help students form additional words.

Required letters

b d e e f i k l l

m n p s t t v w

Decodable word 1: sleep		**Decodable word 2: went**		**Sight word: little**
sleep	sleep	went	lent	little
beep	sleet	sent	lend	
deep	fleet	tent	send	
keep	meet	vent	mend	
		bent	bend	

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Father Bear Goes Fishing—5

Rigby PM Story Book

Step 1: Introduce the book.

Pictures: Father bear went down to the river; Where are the fish?
Vocabulary: shouted, Mother Bear, Father Bear

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.
Required letters **b c d e e f g h** **k l n o o r t w**	

Decodable word 1: down	**Decodable word 2: looked**		**Sight word: where**
down	look	nook	where there
gown	book	rook	
town	cook	took	
clown	hook	brook	
frown	hooked	crook	

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Hide and Seek—5

Rigby PM Story Books

Step 1: Introduce the book.

Characters: Dad, James, Kate, Nick
Vocabulary: hid, shouted, chair, looked, box, win, tree,

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word or nonword on the list. • Point out which words are actually nonwords (*in italics*). • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.
Required letters **b d d e e f h i k** **l m o p r s t x z**	

Decodable word 1: hid		**Decodable word 2: box**	**Sight word: here**
hid	*sid*		here
bid	*fid*	box	
did	*tid*	fox	
kid	*zid*	lox	
lid	*zide*	pox	
mid	*hide**		

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Blackberries—6

Rigby (PM Story Book)

Step 1: Introduce the book.

Pictures and vocabulary: Mother, Father, and Baby Bear went to look for blackberries; They put their blackberries into baskets; Mother and Father bear thought baby bear was lost; They shouted for Baby Bear; They found baby bear but he didn't have any blackberries; Baby Bear had eaten his blackberries.

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a	**b**	**c**	**d**	**e**	**h**	**i**	**j**	**k**	**l**
m	**n**	**p**	**r**	**s**	**t**	**t**	**u**	**v**	**w**

Decodable word 1: went		**Decodable word 2: black**		**Sight word: with**
		black	rack	with
went	pent	back	snack	
sent	rent	sack	lack	
lent	vent	tack	luck	
dent	bent	jack	buck	
tent	spent	mack	tuck	
		pack	duck	

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Baby Hippo—6

Rigby (PM Story Book)

Step 1: Introduce the book.

Pictures: Hippos asleep in river; lions; Mother Hippo wakes up
Vocabulary: asleep; river; safe; hungry; wakes

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a b c e d f g h I k

l m n o p p r s t w z

Decodable word 1: Hippo		**Decodable word 2: wakes**		**Sight word: walk**
hip	ship	wake	take	walk
tip	nip	sake	lake	talk
zip	snip	rake	cake	talks
lip	flip	bake	fake	talking
rip	clip	make	stake	walking
sip	trip			walked
				talked

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

The Hungry Kitten—6

Rigby (PM Story Book)

Step 1: Introduce the book.

Pictures: Kitten likes ___; ____ said, "Go Away"
Vocabulary: hungry, little, kitten, grr, take care, mother, stay

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a	**a**	**b**	**e**	**h**	**i**	**j**	**k**	**l**	**m**
o	**p**	**r**	**s**	**t**	**t**	**v**	**w**	**y**	**z**

Decodable word 1: like		**Decodable word 2: boy**		**Sight word: away**
like	hike	boy	*voy*	away
bike	tike	joy	*loy*	way
pike	strike	toy	soy	say
mike	spike	*zoy*	ploy	stay*

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Choosing a Puppy—7

Rigby PM Story Books

Step 1: Introduce the book.

Characters: (point out characters in book) Rachel, Sam, Andy, Dad
Vocabulary: puppies, asleep, basket, brown, spots, awake, walk, down, thank you, biggest

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

b c d f g h i j l m

n o p r s s t v w z

Decodable word 1: spots		Decodable word 2: brown		Sight word: with
spots	jot	brown	town	with
spot	lot	crown	down	
pot	not	drown	brow	
hot	rot	clown	cow	
cot	bot	frown	how	
dot	*vot*		howl	
got	*zot*			

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Sally and the Sparrows—7

Rigby PM Story Books

Step 1: Introduce the book.

Vocabulary: sparrows, woke, cheep, garden, stayed, hungry, bread

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words

- For the first decodable word, point out the word in the book.
- Help the students find the necessary letters for the word.
- Guide students in forming each word on the list.
- Repeat steps for second decodable word.

Sight word

- For the sight word, help the students form the word with their letters and talk about the way the word looks.
- Have students scramble the letters and reassemble the word. Repeat this procedure.
- Help students form additional words.

Required letters

a b c d e f g h
i l m n r s t v w

Decodable word 1: came		Decodable word 2: she	Sight word: said
came	tame	she	said
fame	dame	he	
game	*vame*	me	
lame	*bame*	we	
name	blame	be	
same	frame		

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

The New Baby—7

Rigby PM Story Books

Step 1: Introduce the book.

Vocabulary: Grandpa, Grandma, hospital, cooking, phone, Emma, take care

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

b	**c**	**d**	**e**	**f**	**h**	**i**	**k**	**l**
m	**n**	**p**	**r**	**s**	**t**	**v**	**w**	**y**

Decodable word 1: help	Decodable word 2: fish	Sight word: new
help	fish	new
welp	wish	stew
kelp	dish	threw
belp	mish	blew
yelp	*vish*	chew
	lish	

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

A Lucky Day for Little Dinosaur—8

Rigby PM Story Books

Step 1: Introduce the book.

Vocabulary: hole, beetle, dinosaur, dragonfly, river, sand

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a b c d e f h j m

n n p r s t t v y

Decodable word 1: ran		Decodable word 2: eat		Sight word: very
ran	man	eat	peat	very
ban	nan	beat	seat	
can	pan	feat	*teat*	
dan	tan	heat	treat	
fan	*san*	meat	treats	
jan	*shan*			

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Little Bulldozer—8

Rigby PM Story Books

Step 1: Introduce the book.

Vocabulary: bulldozer, thank you, fire engine, helping, cried

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.
Required letters **a a d e f g h j k** **l m n o p s t u w y**	

Decodable word 1: help	**Decodable word 2: play**		**Sight word: thank**
help	play	may	
felp	day	nay	
kelp	fay	pay	thank
selp	gay	say	thank you*
nelp	hay	stay	
welp	jay	way	
	lay	away*	

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Tiny and the Big Wave—8

Rigby PM Story Books

Step 1: Introduce the book.

Vocabulary: beach, leash, seagulls, cried, wave, water, here

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a	**a**	**b**	**c**	**e**	**g**	**h**	**k**	**l**
l	**m**	**p**	**r**	**s**	**t**	**u**	**w**	**y**

Decodable word 1: beach		Decodable word 2: seagull		Sight word: away
beach	beat	sea	cull	away
each	bean	tea	gull	
reach	beam	seat	hull	
peach	stream	meat	dull	
beach	*beash*	mean	skull	
beast	leash*			

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Little Bulldozer Helps Again—9

Rigby PM Story Books

Step 1: Introduce the book.

Vocabulary: bulldozer, river, road, help, today, after, truck, sinking, mud, heavy, stuck, rope

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

<table>
<tr><td><i>Decodable words</i>
• For the first decodable word, point out the word in the book.
• Help the students find the necessary letters for the word.
• Guide students in forming each word on the list.
• Repeat steps for second decodable word.</td><td><i>Sight word</i>
• For the sight word, help the students form the word with their letters and talk about the way the word looks.
• Have students scramble the letters and reassemble the word. Repeat this procedure.
• Help students form additional words.</td></tr>
<tr><td colspan="2"><i>Required letters</i>
a c d e h i j l
m n o p p r s t y</td></tr>
</table>

Decodable word 1: rope		Decodable word 2: today		Sight word: into
rope	*rop*	today	hay	
hope	hop	day	jay	into
mope	mop	stay	pay	in
cope	cop	may	cay	to
nope	*nop*	lay	say	
pope	pop	play	tray	

Note: Discuss the difference between rope/rop; hope/hop, etc.

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

The Duck with the Broken Wing—9

Rigby PM Story Books

Step 1: Introduce the book.

Vocabulary: Mother Duck, Father Duck, broken, shell, ducklings, jump, trick, safe, clever, wing, water

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

<table>
<tr><td><i>Decodable words</i>
• For the first decodable word, point out the word in the book.
• Help the students find the necessary letters for the word.
• Guide students in forming each word on the list.
• Repeat steps for second decodable word.</td><td><i>Sight word</i>
• For the sight word, help the students form the word with their letters and talk about the way the word looks.
• Have students scramble the letters and reassemble the word. Repeat this procedure.
• Help students form additional words.</td></tr>
<tr><td colspan="2"><i>Required letters</i>
a b c e f g g i I k
k l m n o p r q t u</td></tr>
</table>

<table>
<tr><th colspan="2">Decodable word 1: trick</th><th>Decodable word 2: going</th><th>Sight word: after</th></tr>
<tr><td></td><td></td><td>going</td><td></td></tr>
<tr><td>trick</td><td>quick</td><td><i>Focus on –ing</i></td><td></td></tr>
<tr><td>tick</td><td>nick</td><td></td><td></td></tr>
<tr><td>pick</td><td><i>mick</i></td><td>tricking</td><td>after</td></tr>
<tr><td>kick</td><td><i>bick</i></td><td>picking</td><td></td></tr>
<tr><td>lick</td><td>brick</td><td>kicking</td><td></td></tr>
<tr><td></td><td></td><td>licking</td><td></td></tr>
</table>

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Tiger Runs Away—9

Rigby PM Story Book

Step 1: Introduce the book.

Vocabulary: Rebecca, house, Tiger, home, smell, away, garden, road, week, again, Saturday, clever

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a	**a**	**b**	**c**	**e**	**e**	**g**	**h**	**i**	**k**	**l**
m	**n**	**o**	**p**	**r**	**s**	**t**	**u**	**v**	**w**	**z**

Decodable word 1: house		*Decodable word 2: week*		**Sight word: again**
house	about	week	*teek*	again
mouse	pout	meek	*veek*	
Focus on /ou/	shout	peek	*zeek*	
out	ouch	seek	*zeet*	
bout	grouch	creek	sleet	
		cheek	street	
		sleek		

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Chug the Tractor—10

Rigby PM Story Books

Step 1: Introduce the book.

Vocabulary: tractor, chug, slowly, shed, dump, beautiful, park, children, shouted

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.
Required letters **b c d f g h j l m** **m p p r s t u w**	

Decodable word 1: Chug		**Decodable word 2: dump**		**Sight word: yellow**
chug	lug			
hug	pug	dump	mumps	
bug	rug	bump	pump	yellow
mug	tug	jump	rump	mellow
dug	*sug*	lump	*tump*	fellow
jug	*shug*	mump	*wump*	
lug	*shrug*			

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

Jane's Car—10

Rigby PM Story Books

Step 1: Introduce the book.

Vocabulary: tow truck, climbed, garage, engine, battery

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a b c d e f g j k l

m n o o p r s s t t

Decodable word 1: car		**Decodable word 2: clean**		**Sight word: took**
car bar far gar jar mar	par star tar tart start stars	clean lean bean dean	jean jeans mean	took look book rook nook

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

The Best Cake—10

Rigby PM Story Books

Step 1: Introduce the book.

Vocabulary: school, fair, cherries, brown, cakes, took care, opened, hungry

Step 2: Coach students through the book.

Step 3: Work with magnetic letters.

Decodable words	*Sight word*
• For the first decodable word, point out the word in the book. • Help the students find the necessary letters for the word. • Guide students in forming each word on the list. • Repeat steps for second decodable word.	• For the sight word, help the students form the word with their letters and talk about the way the word looks. • Have students scramble the letters and reassemble the word. Repeat this procedure. • Help students form additional words.

Required letters

a b c e e f h k l

m o p p r s t v w y

Decodable word 1: make / cake		Decodable word 2: top		Sight word: they
make	sake	top	pop	they
cake	fake	hop	*rop*	
bake	wake	mop	*vop*	
lake	rake	bop	sop	
take	brake	cop	stop	
	stake	lop	step	

Step 4: Help students reread the book.

As students read, point out the words from the word work in the book (key words and words marked with an asterisk*).

APPENDIX K

FEATURES OF TEXT

FEATURES OF TEXT IN READING RECOVERY LEVELED BOOKS

Levels	Features
1-4	• Print is placed on the page conventionally • Concepts are likely familiar to child • Sentence patterns are repetitive—usually one sentence pattern in level 1; up to 2 in 2-4). • Illustrations are highly supportive
5-8	• Repetitive sentence patterns with changing phrases • Illustrations are moderately to highly supportive • Many concepts are likely familiar to child • Opening and closing sentences vary from repetitive pattern
9-10	• Illustrations are moderately supportive. • More complex concepts (less familiar to child). • Repetitive sentence patterns increase to three or more patterns. • Language structures are more complex (Peterson, 1991).

(Levels provided were used in the intervention. Reading Recovery leveling extends to Level 20.)

APPENDIX L

INTERVENTION BOOK LIST

INTERVENTION BOOK LIST

Giles, J. (1997). Choosing a puppy. Crystal River, ILL: Rigby Education.

Giles, J. (1997). Chug the tractor. Crystal River, ILL: Rigby Education.

Giles, J. (1997). Hide and seek. Crystal River, ILL: Rigby Education.

Giles, J. (1997). Sally and the sparrows. Crystal River, ILL: Rigby Education.

Price, H. (1997). A lucky day for little dinosaur. Crystal River, ILL: Rigby Education.

Randell, B. (1996). Blackberries. Crystal River, ILL: Rigby Education.

Randell, B. (1996). Tiger, tiger. Crystal River, ILL: Rigby Education.

Randell, B. (1996). Father bear goes fishing. Crystal River, ILL: Rigby Education.

Randell, B. (1996). Hot dogs. Crystal River, ILL: Rigby Education.

Randell, B. (1996). Jane's car. Crystal River, ILL: Rigby Education.

Randell, B. (1996). Little Bulldozer. Crystal River, ILL: Rigby Education.

Randell, B. (1996). Sally and the daisy. Crystal River, ILL: Rigby Education.

Randell, B. (1996). The best cake. Crystal River, ILL: Rigby Education.

Randell, B. (1996). The duck with the broken wing. Crystal River, ILL: Rigby Education.

Randell, B. (1996). The hungry kitten. Crystal River, ILL: Rigby Education.

Randell, B. (1996). The lazy pig. Crystal River, ILL: Rigby Education.

Randell, B. (1996). The merry-go-round. Crystal River, ILL: Rigby Education.

Randell, B. (1996). The new baby. Crystal River, ILL: Rigby Education.

Randell, B. (1997). A home for little teddy. Crystal River, ILL: Rigby Education.

Randell, B. (1997). Baby Hippo. Crystal River, ILL: Rigby Education.

Randell, B. (1997). Ben's red car. Crystal River, ILL: Rigby Education.

Randell, B. (1997). The baby owls. Crystal River, ILL: Rigby Education.

Randell, B., Giles, J., & Smith, A. (1996). Little things. Crystal River, ILL: Rigby Education.

Randell, B., Giles, J., & Smith, A. (1996). Me. Crystal River, ILL: Rigby Education.

Randell, B., Giles, J., & Smith, A. (1996). Playing. Crystal River, ILL: Rigby Education.

Randell, B., Giles, J., & Smith, A. (1996). The go-carts. Crystal River, ILL: Rigby Education.

Randell, B., Giles, J., & Smith, A. (1996). Time for dinner. Crystal River, ILL: Rigby Education.

Smith, A. (1997). Little bulldozer helps again. Crystal River, ILL: Rigby Education.

Smith, A. (1997). Tiger runs away. Crystal River, ILL: Rigby Education.

Smith, A. (1997). Tiny and the big wave. Crystal River, ILL: Rigby Education.

APPENDIX M

FIDELITY CHECKLISTS

Manipulative Alphabetic Word Work Intervention Treatment Fidelity Checklist

Comparison Group

Instructor: ______________________ Date: __________

Observer: ______________________

Step 1: Introduce the Book

		Yes	No	NA
The instructor introduced the book and discussed the story.				
	Instructor discussed illustrations			
	Instructor pointed out repetitive language			
	Instructor used vocabulary from story			

Step 2: Coach the students through the Book

	Yes	No	NA
The instructor coached students through the book.			

Step 3: Work with Magnetic Letters

	Yes	No	NA
The instructor **did not** work with the students using magnetic letters*.			

* A Yes indicates that the instructor implemented the comparison intervention without the manipulative alphabetic word work.

Step 4: Help Students Reread the Book

	Yes	No	NA
The instructor helped students reread the book.			

Manipulative Alphabetic Word Work Intervention Treatment Fidelity Checklist

Instructor: ______________________ Date: __________

Observer: ______________________

Step 1: Introduce the Book

	Yes	No	NA
The instructor introduced the book and discussed the story.			
Instructor discussed illustrations			
Instructor pointed out repetitive language			
Instructor used vocabulary from story			

Step 2: Coach the students through the Book

	Yes	No	NA
The instructor coached students through the book.			

Step 3: Work with Magnetic Letters

	Yes	No	NA
The instructor worked with magnetic letters.			
Instructor guided students in word work with two decodable words.			
Instructor guided students in word work with one sight word.			
Instructor helped students locate words from their word work in the text.			

Step 4: Help Students Reread the Book

	Yes	No	NA
The instructor helped students reread the book.			

APPENDIX N

STUDENT DATA FILE

DEMOGRAPHIC DATA

School	# of Lessons	Group	Student	Sex	Race	Lunch Status	SLD	EMH	EH	Title 1	Speech/Language	ESOL	PPVT
1	29	1	1	2	2	3	0	0	0	0	0	0	101
1	29	1	2	1	5	3	0	0	0	1	0	0	81
1	29	1	3	1	5	1	0	0	0	1	0	0	74
2	28	1	4	2	2	3	0	0	0	1	0	0	75
2	27	1	5	1	1	1	0	0	0	0	0	0	89
2	25	1	6	2	2	1	0	0	0	0	0	0	84
3	29	1	7	1	1	1	0	0	0	1	0	0	67
3	29	1	8	1	1	1	0	0	0	0	0	0	92
3	27	1	9	2	1	1	0	0	0	0	0	0	66
4	27	1	10	1	1	1	0	0	0	0	0	0	97
4	30	1	11	2	1	3	0	0	0	0	0	0	78
4	28	1	12	1	1	1	0	0	0	0	0	0	68
4	30	1	13	1	1	1	0	0	0	1	0	0	71
4	28	1	14	2	1	1	0	0	0	0	0	0	75
4	26	1	15	1	2	1	0	0	0	0	0	0	86
5	24	1	16	1	1	1	0	0	0	1	1	0	60
5	27	1	17	2	2	1	0	0	0	1	1	0	59
5	28	1	18	2	1	1	0	0	0	1	1	0	61
7	28	1	19	1	1	1	0	0	0	0	1	0	62
7	28	1	20	1	2	3	0	0	0	0	1	0	121
7	29	1	21	2	1	1	0	0	0	0	0	0	85
8	28	1	22	1	2	1	0	0	0	0	1	0	80
8	28	1	23	1	1	1	0	0	0	1	0	0	64
8	28	1	24	1	4	1	0	0	0	0	0	0	76
9	27	1	25	1	1	1	0	0	0	1	0	0	64
9	25	1	26	1	1	1	0	0	0	1	0	0	64
9	30	1	27	1	1	1	0	0	0	1	0	0	80
9	29	1	28	2	3	1	0	0	0	1	0	1	44
9	28	1	29	1	1	2	0	0	0	1	0	0	63
9	21	1	30	1	2	1	0	0	0	1	0	0	105
9	27	1	31	1	1	1	0	0	0	1	1	0	90
9	27	1	32	1	1	1	0	0	0	1	0	0	72
9	28	1	33	1	1	1	0	0	0	1	0	0	70

1	28	2	34	2	1	1	0	0	0	1	1	0	93
1	29	2	35	1	1	1	0	0	0	1	1	0	100
1	30	2	36	1	2	3	0	0	0	0	0	0	110
2	28	2	37	1	2	2	0	0	0	0	0	0	87
2	28	2	38	2	1	1	0	0	0	1	1	0	71
2	27	2	39	1	1	1	0	0	0	1	1	0	46
3	30	2	40	2	2	1	0	0	0	1	0	0	94
4	26	2	41	1	1	1	0	0	0	0	0	0	90
4	27	2	42	2	4	1	0	0	0	0	0	0	
4	27	2	43	2	1	1	0	0	0	0	0	0	83
4	30	2	44	1	2	1	0	0	0	1	0	0	87
4	28	2	45	1	2	2	0	0	0	1	0	0	103
4	26	2	46	2	1	1	0	0	0	0	0	0	70
4	27	2	47	1	1	2	0	0	0	0	0	0	90
5	25	2	48	1	1	1	0	0	0	1	0	0	60
5	25	2	49	1	2	1	0	0	0	1	0	0	96
5	25	2	50	1	1	1	0	0	0	1	0	0	66
5	25	2	51	2	1	1	0	0	0	1	0	0	61
5	25	2	52	1	1	1	0	0	0	1	0	0	82
5	25	2	53	2	1	1	0	0	0	1	1	0	58
7	28	2	54	1	2	3	0	1	0	0	1	0	
7	30	2	55	2	3	3	0	0	0	0	0	1	48
7	30	2	56	1	1	1	0	0	0	0	0	0	96
8	29	2	57	1	5	3	0	0	0	0	0	0	111
8	26	2	58	1	1	1	0	0	0	0	0	0	69
8	28	2	59	2	5	1	0	0	0	0	0	0	82
9	29	2	60	1	1	1	0	0	0	1	0	0	86
9	28	2	61	1	1	1	0	0	0	1	0	0	65
9	28	2	62	1	2	3	0	0	0	1	1	0	62
9	27	2	63	2	1	1	0	0	0	1	0	0	81
9	27	2	64	1	2	1	0	0	0	1	0	0	79
9	29	2	65	1	1	1	0	0	0	1	0	0	93
1	0	3	66	1	4	1	0	0	0	1	0	0	95
1	0	3	67	1	2	3	0	0	0	1	0	0	103
1	0	3	68	2	1	1	0	0	0	0	0	0	50
2	0	3	69	1	1	1	0	0	0	0	0	0	66
2	0	3	70	1	1	1	0	0	0	0	0	0	88
3	0	3	71	2	1	1	1	0	0	1	0	0	64
4	0	3	72	2	1	1	0	0	0	0	0	0	70
4	0	3	73	2	2		0	0	0	1	0	0	111
4	0	3	74	1	5	1	0	0	0	0	0	0	78
4	0	3	75	1	1	1	0	0	0	0	0	0	57
4	0	3	76	2	1	1	0	0	0	1	0	0	96

5	0	3	77	1	1	1	1	0	0	1	0	0	49
5	0	3	78	2	1	1	0	0	0	1	0	0	73
5	0	3	79	1	2	1	1	0	0	1	0	0	80
5	0	3	80	1	1	1	0	0	0	1	0	0	66
5	0	3	81	1	5	1	0	0	0	1	1	0	68
5	0	3	82	1	1	1	0	1	0	1	1	0	56
5	0	3	83	2	2	3	0	0	0	1	0	0	79
6	0	3	84	2	2	3	0	0	0	0	0	0	101
6	0	3	85	2	1	1	0	0	0	0	0	0	83
6	0	3	86	2	3	3	0	0	0	0	0	0	74
7	0	3	87	2	1	1	0	0	0	0	0	0	91
8	0	3	88	1	1	1	0	0	0	0	1	0	74
8	0	3	89	2	1	1	0	0	0	0	0	0	77
8	0	3	90	1	2	1	0	0	0	1	0	0	63
9	0	3	91	2	1	1	0	0	0	1	0	0	74
9	0	3	92	2	1	1	0	0	0	1	0	0	67
9	0	3	93	1	1	1	0	0	0	1	0	0	79
9	0	3	94	2	1	1	0	0	0	1	0	0	86
9	0	3	95	2	1	1	0	0	0	1	0	0	73
9	0	3	96	2	2	1	0	0	0	1	0	0	45
9	0	3	97	2	1	1	0	0	0	1	0	0	72
9	0	3	98	1	1	1	0	0	0	1	0	0	108

Codes

Group: Treatment = 1, Comparison = 2, Control = 3
Gender: Male = 1, Female = 2
Ethnicity: Black = 1, White = 2, Asian = 3, Other = 4, Hispanic = 5
Lunch Status: Free = 1, Reduced = 2, Full Pay = 3
All other categories: No = 0, Yes = 1

PHONOLOGICAL AWARENESS DATA

Group	School	# of Lessons	Student	Word	Word-Post	Syllable	Syllable-Post	Onset/Rime	Onset/Rime-Post	Phoneme	Phoneme-Post	Total	Total-Post
1	1	29	1	9	10	9	13	9	15	11	18	38	56
1	1	29	2	6	10	8	12	12	13	18	19	44	54
1	1	29	3	5	10	12	15	9	9	17	16	43	50
1	2	28	4	9	9	12	14	13	13	10	14	44	50
1	2	27	5	10	10	14	15	11	14	17	19	52	58
1	2	25	6	9	9	10	11	14	13	13	19	46	52
1	3	29	7	3	8	7	15	14	14	6	7	30	44
1	3	29	8	6	9	12	14	14	14	13	15	45	52
1	3	27	9	10	10	9	13	13	14	9	11	41	48
1	4	27	10	4	10	9	13	11	15	9	17	33	55
1	4	30	11	7	10	9	12	7	8	17	17	40	47
1	4	28	12	8	10	8	15	10	12	7	15	33	52
1	4	30	13	10	10	13	14	13	14	17	19	53	57
1	4	28	14	7	7	13	12	12	14	11	15	43	48
1	4	26	15	8	9	14	14	8	10	18	20	48	53
1	5	24	16	10	10	12	14	12	14	8	20	42	58
1	5	27	17	2	8	9	15	5	10	2	16	18	49
1	5	28	18	9	10	10	13	11	12	15	18	45	53
1	7	28	19	7	7	10	10	7	6	2	4	26	27
1	7	28	20	10	10	12	12	9	9	14	16	45	47
1	7	29	21	10	10	14	15	11	13	13	16	48	54
1	8	28	22	8	9	13	15	10	15	16	17	47	56
1	8	28	23	4	9	4	9	9	13	9	13	26	44
1	8	28	24	9	10	10	14	15	15	10	17	44	56
1	9	27	25	9	10	11	15	12	14	10	19	42	58
1	9	25	26	8	10	9	13	8	10	5	15	30	48
1	9	30	27	6	10	7	11	8	9	7	18	28	48
1	9	29	28	5	10	6	12	7	10	9	18	27	50
1	9	28	29	4	10	12	14	6	14	2	16	24	54
1	9	21	30	7	7	9	13	10	12	4	8	30	40
1	9	27	31	10	10	14	15	14	15	16	19	54	59
1	9	27	32	8	10	13	14	13	15	15	20	49	59
1	9	28	33	8	7	13	14	12	13	8	15	41	49

2	1	28	34	10	10	10	14	13	14	8	14	41	52
2	1	29	35	9	10	9	12	14	15	13	13	45	50
2	1	30	36	10	10	9	13	13	14	16	17	48	54
2	2	28	37	10	10	14	15	12	14	11	16	47	55
2	2	28	38	10	9	8	13	8	8	6	6	32	36
2	2	27	39	4	5	6	9	6	8	5	10	21	32
2	3	30	40	10	10	9	14	11	12	14	15	44	51
2	4	26	41	8	9	12	14	9	14	15	18	44	##
2	4	27	42	6	8	11	11	13	14	16	18	46	51
2	4	27	43	10	10	11	13	13	15	16	17	50	55
2	4	30	44	9	9	6	10	9	13	4	17	28	49
2	4	28	45	4	9	13	12	13	13	13	18	43	52
2	4	26	46	3	6	5	9	8	11	9	14	25	40
2	4	27	47	9	10	11	15	13	15	19	19	52	59
2	5	25	48	7	9	12	14	11	13	7	6	37	42
2	5	25	49	10	10	11	11	14	14	15	16	50	51
2	5	25	50	5	9	12	14	6	12	2	11	25	46
2	5	25	51	8	10	9	10	11	14	14	20	42	54
2	5	25	52	9	10	14	11	13	13	9	9	45	43
2	5	25	53	8	10	9	15	8	9	2	4	27	38
2	7	28	54	0	1	3	4	4	6	0	2	7	13
2	7	30	55	4	9	7	14	10	13	9	9	30	45
2	7	30	56	8	9	10	12	11	11	7	13	36	45
2	8	29	57	9	10	14	15	11	12	11	19	45	56
2	8	26	58	10	10	13	14	10	15	10	17	43	56
2	8	28	59	9	10	12	14	9	12	13	14	34	50
2	9	29	60	9	10	12	15	7	11	6	16	34	52
2	9	28	61	9	6	6	11	7	8	2	9	24	34
2	9	28	62	4	6	11	14	5	8	4	8	24	36
2	9	27	63	10	10	13	14	12	14	13	14	48	52
2	9	27	64	10	10	9	13	10	11	9	15	38	49
2	9	29	65	10	9	15	15	15	15	13	17	53	56
3	1	0	66	10	10	11	14	11	10	12	13	44	47
3	1	0	67	9	10	8	9	14	15	18	17	49	51
3	1	0	68	6	10	6	12	11	15	12	15	35	52
3	2	0	69	4	7	7	13	13	14	10	14	34	48
3	2	0	70	8	9	13	15	11	14	11	19	43	57
3	3	0	71	6	8	14	15	8	11	5	8	33	42
3	4	0	72	7	9	9	8	12	7	10	15	38	39
3	4	0	73	9	10	6	14	11	12	16	18	42	54
3	4	0	74	10	10	10	12	7	9	14	15	41	46
3	4	0	75	8	8	7	11	11	14	14	16	40	49
3	4	0	76	10	10	10	10	8	10	10	14	38	44

3	5	0	77	6	4	10	9	10	11	6	5	32	29
3	5	0	78	10	10	15	15	14	11	9	14	48	50
3	5	0	79	7	10	11	11	15	13	13	15	46	49
3	5	0	80	7	7	8	9	9	7	12	8	36	31
3	5	0	81	5	8	8	14	9	11	1	10	23	43
3	5	0	82	4	6	6	10	13	14	1	12	24	42
3	5	0	83	3	8	6	8	10	12	7	19	26	47
3	6	0	84	9	10	13	12	8	10	15	17	45	49
3	6	0	85	8	10	8	14	13	13	13	16	42	53
3	6	0	86	9	10	11	14	13	13	14	15	47	52
3	7	0	87	6	9	11	14	12	14	11	13	40	50
3	8	0	88	9	10	9	11	14	15	10	10	42	46
3	8	0	89	8	9	11	9	13	13	13	14	45	45
3	8	0	90	8	5	9	10	10	9	10	12	37	36
3	9	0	91	9	9	14	14	14	15	10	20	57	58
3	9	0	92	10	10	10	14	15	15	15	20	50	59
3	9	0	93	8	10	14	13	12	13	9	15	43	51
3	9	0	94	10	10	10	9	11	9	13	20	44	48
3	9	0	95	7	8	14	14	14	13	11	15	46	50
3	9	0	96	5	9	6	7	12	13	19	20	42	49
3	9	0	97	9	8	11	12	13	13	5	11	38	44
3	9	0	98	10	10	9	11	12	13	13	16	44	50

DECODING AND WORD RECOGNITION DATA

Group	Student	School	Decoding--CVC	Decoding--CVC-Post	Decoding--Nonwords	Decoding--Nonwords-Post	Sight Words	Sight Words-Post	LSS	LSS-Post	Word Identification-Post	Word Attack-Post
1	1	1	2	17	7	16	51	116	5	10	30	10
1	2	1	19	20	17	19	48	98	8	10	26	12
1	3	1	16	19	8	17	43	47	10	10	26	6
1	4	2	14	11	0	0	10	14	8	10	19	2
1	5	2	14	16	0	9	9	41	1	7	24	10
1	6	2	3	14	0	0	9	29	7	6	29	9
1	7	3	1	20	1	12	3	2	4	6	14	0
1	8	3	15	17	6	16	38	51	9	10	21	15
1	9	3	14	18	8	16	45	113	10	10	29	9
1	10	4	3	20	3	20	0	8	4	10	21	5
1	11	4	9	20	8	19	45	120	10	10	28	8
1	12	4	4	17	0	17	10	26	5	10	19	2
1	13	4	14	19	0	19	83	116	8	10	31	13
1	14	4	13	17	14	16	10	50	8	9	20	5
1	15	4	7	18	8	20	8	97	7	9	24	6
1	16	5	12	18	9	14	4	40	2	6	21	2
1	17	5	0	5	0	5	5	28	5	8	17	3
1	18	5	6	7	4	14	10	44	7	8	19	5
1	19	7	0	0	0	0	4	5	3	2	14	0
1	20	7	7	14	4	6	46	76	10	10	22	5
1	21	7	14	18	2	8	103	118	7	10	24	8
1	22	8	6	16	2	9	35	48	10	10	19	5
1	23	8	11	17	5	14	14	45	5	9	25	9
1	24	8	18	20	17	17	30	84	10	10	27	7
1	25	9	18	16	15	15	6	11	9	10	19	8

1	26	9	0	16	0	5	0	5	0	7	14	2
1	27	9	14	16	3	17	13	43	7	7	23	9
1	28	9	9	19	0	19	10	115	7	7	27	13
1	29	9	4	20	0	20	0	9	2	10	21	8
1	30	9	2	17	0	12	0	11	3	8	20	7
1	31	9	2	18	2	17	6	9	5	9	20	6
1	32	9	16	19	17	20	47	113	10	10	30	12
1	33	9	15	19	10	19	14	87	5	9	27	12
2	34	1	16	19	6	15	36	71	6	9	25	6
2	35	1	19	20	17	18	31	49	7	9	25	7
2	36	1	16	18	17	17	14	35	9	10	22	6
2	37	2	17	20	18	18	101	113	10	10	27	15
2	38	2	0	0	0	0	3	5	2	8	16	2
2	39	2	8	6	0	0	3	11	1	0	18	2
2	40	3	2	10	0	15	43	62	10	10	26	7
2	41	4	1	19	0	19	1	9	3	8	17	2
2	42	4	12	18	13	15	8	42	6	10	21	2
2	43	4	19	20	14	20	46	8	9	10	21	5
2	44	4	2	15	0	2	8	27	2	9	17	3
2	45	4	10	17	17	3	14	82	7	6	20	4
2	46	4	14	19	13	18	5	14	3	6	21	4
2	47	4	20	20	18	20	110	120	10	10	33	19
2	48	5	15	8	14	13	27	40	7	10	20	8
2	49	5	19	19	16	18	7	28	5	9	18	7
2	50	5	1	0	0	0	5	5	4	6	16	0
2	51	5	16	16	14	18	33	110	7	10	28	14
2	52	5	0	0	0	0	0	3	6	6	14	0
2	53	5	0	0	0	0	0	7	0	0	16	0
2	54	7	15	16	0	2	14	30	1	3	19	3
2	55	7	20	20	19	19	116	120	9	10	37	20
2	56	7	3	4	2	2	43	43	7	10	22	5
2	57	8	7	15	6	10	49	108	7	10	27	9
2	58	8	6	11	6	6	14	11	5	7	24	7
2	59	8	11	17	4	7	31	42	7	7	22	7
2	60	9	0	1	0	0	2	13	6	5	19	6
2	61	9	2	2	0	0	0	0	0	0	12	0
2	62	9	0	0	0	0	0	2	0	1	12	0
2	63	9	14	17	15	16	36	105	8	10	25	8

2	64	9	0	20	0	17	12	76	5	6	24	10
2	65	9	0	20	0	15	45	118	9	10	29	12
3	66	1	9	17	12	16	44	40	10	10	22	6
3	67	1	15	17	9	12	10	50	9	9	34	9
3	68	1	18	18	15	16	30	63	6	7	23	12
3	69	2	0	18	0	9	0	6	5	6	30	7
3	70	2	14	17	0	14	47	67	8	9	26	6
3	71	3	0	16	0	14	6	14	4	7	18	5
3	72	4	4	10	0	7	4	8	2	6	16	1
3	73	4	16	17	8	17	7	43	10	10	23	7
3	74	4	10	9	10	9	11	8	4	7	18	5
3	75	4	20	19	20	13	7	106	8	9	24	5
3	76	4	19	17	14	15	17	39	9	9	24	6
3	77	5	8	11	4	4	5	9	5	5	16	0
3	78	5	2	6	0	10	10	22	5	7	14	2
3	79	5	17	7	13	15	1	8	6	10	20	2
3	80	5	15	13	4	1	14	14	5	5	19	1
3	81	5	1	11	0	0	1	8	1	8	18	3
3	82	5	4	16	0	5	6	13	3	7	15	0
3	83	5	1	1	2	4	4	6	4	8	20	5
3	84	6	16	17	10	10	109	115	10	10	29	4
3	85	6	15	16	12	13	14	45	8	9	24	6
3	86	6	11	16	12	13	14	52	7	9	22	3
3	87	7	9	11	3	3	38	79	6	6	23	6
3	88	8	9	8	14	11	45	40	4	5	23	5
3	89	8	4	17	6	11	8	19	5	4	19	1
3	90	8	1	3	0	5	3	12	7	10	16	3
3	91	9	10	16	7	19	12	24	8	8	22	9
3	92	9	9	9	3	3	43	111	9	9	29	6
3	93	9	13	15	0	5	47	51	9	9	26	2
3	94	9	12	16	0	20	45	42	10	8	25	3
3	95	9	2	3	0	0	13	27	5	7	19	4
3	96	9	0	18	0	12	46	32	9	9	21	6
3	97	9	0	15	0	6	4	14	5	8	20	3
3	98	9	15	16	13	12	37	35	7	10	19	3

FLUENCY AND COMPREHENSION DATA

Group	Student	School	Fluency	Fluency-Post	Comprehension	Comprehension-Post
1	1	1	50	69	9	19
1	2	1	8	37	0	9
1	3	1	9	30	0	10
1	4	2	7	10	1	2
1	5	2	12	24	3	12
1	6	2	0	19	0	5
1	7	3	5	8	0	0
1	8	3	9	13	0	0
1	9	3	47	61	8	11
1	10	4	0	12	0	4
1	11	4	40	84	3	15
1	12	4	3	18	0	7
1	13	4	34	54	3	7
1	14	4	17	30	3	8
1	15	4	19	25	4	7
1	16	5	14	18	2	2
1	17	5	0	15	0	4
1	18	5	0	0	0	0
1	19	7	1	3	0	0
1	20	7	39	37	0	0
1	21	7	54	57	11	13
1	22	8	16	23	5	10
1	23	8	14	30	2	9
1	24	8	18	32	0	5
1	25	9	1	11	0	1

1	26	9	0	0	0	0
1	27	9	5	15	0	7
1	28	9	12	45	2	7
1	29	9	0	12	0	9
1	30	9	3	11	0	2
1	31	9	9	12	1	5
1	32	9	58	95	5	9
1	33	9	7	28	0	6
2	34	1	10	45	0	14
2	35	1	17	45	0	13
2	36	1	13	22	0	4
2	37	2	18	40	4	9
2	38	2	0	0	0	0
2	39	2	1	5	0	1
2	40	3	10	13	0	0
2	41	4	0	0	0	1
2	42	4	21	18	5	13
2	43	4	42	12	5	4
2	44	4	4	13	0	5
2	45	4	23	25	3	16
2	46	4	10	35	2	11
2	47	4	54	80	5	7
2	48	5	9	25	0	6
2	49	5	2	8	0	0
2	50	5	0	0	0	0
2	51	5	31	36	1	4
2	52	5	3	0	0	0
2	53	5	0	0	0	0
2	54	7	3	18	0	0
2	55	7	70	85	5	10
2	56	7	39	20	0	0
2	57	8	14	51	6	16
2	58	8	7	21	0	6
2	59	8	8	25	0	10
2	60	9	8	17	1	1
2	61	9	0	0	0	0
2	62	9	3	4	0	0
2	63	9	19	50	3	3

2	64	9	10	39	2	20
2	65	9	30	64	1	9
3	66	1	31	30	3	8
3	67	1	28	54	13	15
3	68	1	11	29	0	14
3	69	2	0	4	0	1
3	70	2	38	33	13	16
3	71	3	12	16	0	0
3	72	4	0	0	0	0
3	73	4	12	24	0	0
3	74	4	9	18	1	14
3	75	4	20	37	0	7
3	76	4	27	20	2	6
3	77	5	3	0	0	0
3	78	5	1	9	0	0
3	79	5	19	12	1	1
3	80	5	12	10	0	0
3	81	5	0	9	0	0
3	82	5	0	9	0	3
3	83	5	0	0	0	0
3	84	6	88	98	6	13
3	85	6	16	41	3	4
3	86	6	12	52	2	3
3	87	7	20	38	40	0
3	88	8	10	12	0	0
3	89	8	8	18	0	3
3	90	8	0	0	0	0
3	91	9	0	22	0	4
3	92	9	21	42	4	9
3	93	9	28	50	3	9
3	94	9	22	24	1	5
3	95	9	10	15	0	1
3	96	9	41	41	5	6
3	97	9	4	6	0	0
3	98	9	15	28	13	2

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BIOGRAPHICAL SKETCH

Paige Cullen Pullen was born in Panama City, Florida, on September 27, 1966, the second of three children. She graduated from Bay High School in 1984 and then attended the University of Florida where she received a B.A.E. in elementary education in 1988. She received her M.Ed. with an emphasis in early childhood education from the University of Florida in 1990.

During the period between 1988 and 1999, Paige taught elementary school in Dekalb County, Georgia, and Alachua County, Florida, school districts. Her 11 years of teaching experience included teaching elementary education in the primary grades as well as teaching students with learning problems in grades 1 through 5. Paige also served as a teacher specialist, providing assistance to teachers in intervention strategies for students with disabilities and reading problems. While completing her doctoral studies at the University of Florida, Paige served as a graduate teaching assistant and a graduate research assistant in the Department of Special Education and the School of Teaching and Learning.

Paige has also presented at numerous local, state, national, and international conferences. Her conference presentations have focused on phonological awareness, assessment of early literacy development, and positive behavioral supports. She has also conducted several inservice teacher education workshops on early literacy development.

In the future, Paige plans to pursue research in the area of reading acquisition and the early prevention of reading disability. Additionally, she is interested in preservice and inservice teacher education, specifically in the area of effective reading instruction. Paige is also interested in family literacy development and classroom management. She hopes to pursue a career teaching at the university level.

I certify that I have read this study and that, in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Cecil D. Mercer

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I certify that I have read this study and that, in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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